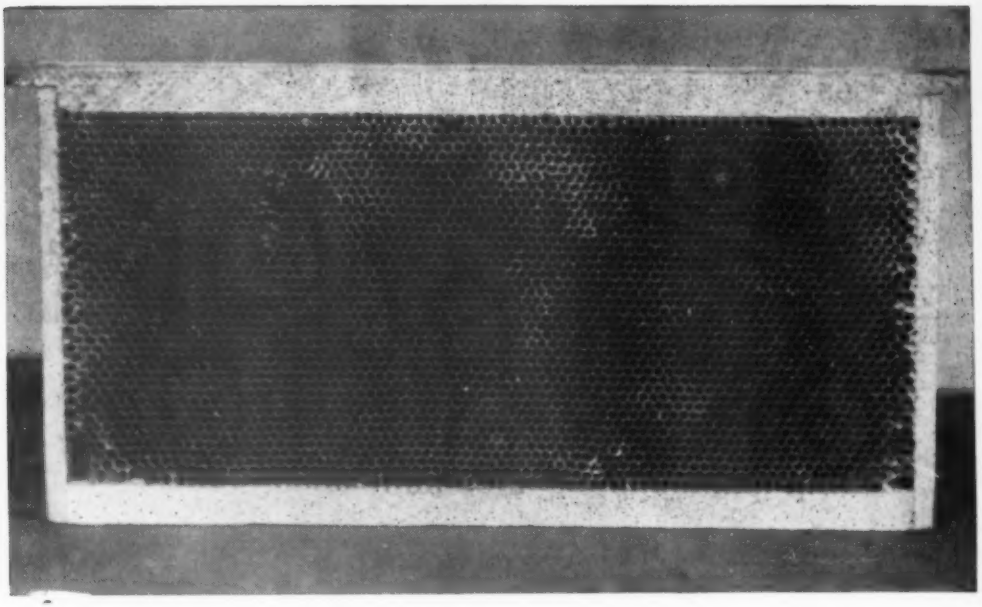
AMERICAN BEE JOURNAL

August 1941

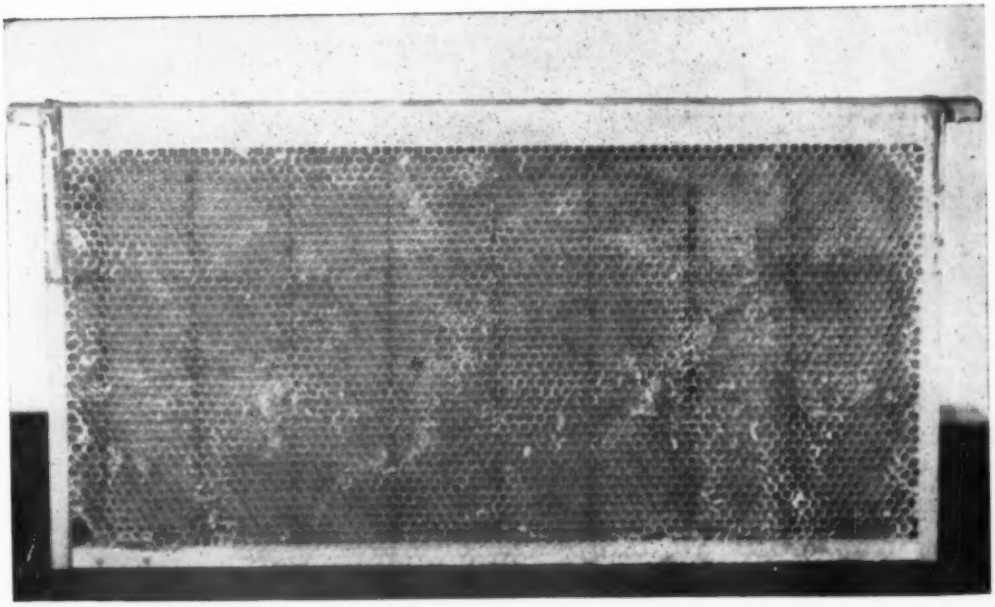
PORTRAIT OF NAPOLEON
By Lefevre



SIXTEEN YEARS OF HONEY CROPS AND BEES

This comb (upper one) was drawn 18 years ago. I have other combs just as near perfect and older but they could not be reached conveniently. I have no record of the number of times it has been through the extractor and it has been in many different colonies of bees. I want to tell you a California beekeeper is hard on combs. We often take combs with four to eight pounds of honey in them, 30 to 50 miles over the roads. I am convinced the life-long quality of combs from Dadant's Wired Foundation should give them twenty years of use, retain their shape and give the beekeeper 95% worker cell capacity. The lighter comb (lower one) was drawn in 1937. Note how nearly the two combs are alike in finish.

L. E. Orr,
Lemoore,
California.



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AMERICAN BEE JOURNAL

EDITORS: G. H. CALE, FRANK C. PELLETT, M. G. DADANT, J. C. DADANT.

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EDITORIAL

GOVERNMENT HELP FOR HONEY PRICES

IN our July number we inadvertently left out a report of the purchases of the Surplus Marketing Administration of honey in the western states. We were too late, at any rate, to give our subscribers information relative to what the government was doing, inasmuch as the campaign was instituted and carried out between the coming out of the June and July issues of this magazine.

For our readers' information about June 1 the Surplus Marketing Administration announced that it was prepared to buy seven million pounds of honey in the western states at a price of 4½ cents a pound f. o. b. producer's station or assembly points. Submission of offers was to be made by June 17. Purchase under the authority was extended to terminate on June 30. All honey was to be U. S. grade light amber or lighter. Originally it was all to be liquid honey but this was later revised to allow granulated honey to qualify.

Although announcements were pretty generally circulated to the larger beekeepers, many of them knew nothing of it until the period allotted had expired. Under such conditions it is not surprising that slightly over three and one-half million pounds of honey was offered by the beekeepers and, we assume, taken up by the Surplus Marketing Administration. On this point we do not have the details, but probably the honey is not all taken yet.

As offer was made on seven million pounds, it is assumed that the Surplus Marketing Administration will be prepared to purchase the other three and one-half million pounds a little later, although we have no definite statement to this effect.

We wish to call to our readers' attention the fact which was largely unnoticed either by the press or by the congressmen that when Congress passed an amendment to the present Commodity Credit Bill—now a law—this ordered the Department of Agriculture to establish 85% of parity prices for all farm products. This should prove of great importance to farmers, handlers, processors, and others engaged in food production.

It is assumed that the major aim of the new amendment was to boost production of essential food crops.

We have no indication at the present that immediate action is to be taken to boost the price of honey and beeswax to 85% of parity level. Probably poultry products, dairy products, and some canned materials will be first in line on the parity program.

However, our readers must understand that since all farm products are included in the law that honey will ultimately receive attention. Just when or how such action will be taken is undetermined. Undoubtedly the action of the Surplus Marketing Administration was due partly to this parity stipulation and partly to the efforts of various beekeeping groups to have the Surplus Marketing Administration relieve the congestion on some types of honey.

For our readers' information, the parity price of any commodity may be defined as that price which will give the farmer's dollar the same purchasing power relative to the things a farmer buys with that it had in the period of 1909 to 1914. The writer has made a survey of the prices of honey during the 1909 to 1914 period and would estimate that 85% of parity price should mean a price on white honey, f. o. b. shipper's point in the West, of around 5¾ to 6 cents per pound.

We leave to our readers' own inference and guess, naturally, just what effect this is to have upon honey although it can hardly have anything but a good effect in view of the possibility of such action and the already instituted action of the Surplus Marketing Administration in purchasing the three and one-half million pounds of western honey.

It is also extremely likely that as one farm product reaches parity, the effort of the Com-

modity Credit Administration will be voted to other commodities in the farm line which have not yet reached the 85% of parity.

We hope to have more definite information later on and we hope that various beekeeping groups will make a definite demand on Secretary of Agriculture Wickard, through their farm agencies or through their representatives, for an effort to bring honey to the 85% of parity price. Undoubtedly those groups which are most active and which can show that their product is below parity will receive first and most attention.

♦

INSTITUTE LITERATURE

THE A. G. Woodman Company makes a very apropos suggestion relative to the possibility of getting libraries and schools to use American Honey Institute literature. This has been brought to his mind since the issuing of the new booklet by the American Honey Institute entitled "Old Favorite Honey Recipes." Two copies donated to his local library have not only brought additional requests to him but to the American Honey Institute.

Most certainly a campaign like he suggests should be carried out in all states to see that every library has a copy of this new booklet and that every high school home economic department is also supplied with a copy of the booklet "Old Favorite Honey Recipes." The logical method would be through the state beekeepers' association and their local affiliates although, if necessary, individuals could very well supply the libraries and schools in their vicinity.

When the American Honey Institute functions as it should which it will when sufficient funds are forthcoming, this could automatically be taken care of by the Institute itself by blanket circularization. Are we as beekeepers not foresighted by failing to provide the Institute with funds necessary for the carrying out of such projects?

♦

THE BEST RACE OF BEES

FROM Russia comes the suggestion that many of the misfortunes of the American beekeeper come from the selection of a race of bees unsuited to the climate of the locality in which he lives.

> "All the life of the bee is directed by the time of harvest and if that does not coincide with the nature of the bee, the beekeeper falls just that much short of perfection in the work of beekeeping.
>
> "Bees of the South where the time of harvest of nectar and pollen is ordinarily longer than in the North, always suffer in a colder country from lack of stores in winter because their nature has adapted itself to a longer harvest season and they continue their work without the least attention to the lack of available nectar."

Our correspondent tells of two different strains of bees in use in Germany. One which is especially well suited to the valley of Lunebourg where the heather harvest lasts a month or more beyond any other part of the country, he describes as of no value elsewhere.

In our June issue we quoted the British magazine, "Bee World," to the effect that the best bee is best only for the district for and in which she is bred. A few of our large scale honey producers making a start at selective breeding by sending their best queens to breeders in the south in order that increase and replacements can be made from their own stock.

♦

THE NATIONAL CONVENTIONS

FOR the first time in a number of years the national meetings will be held this year in the state of New York. The plan of rotating the conventions north, south, east, and west is a good one, since it brings an occasional meeting within reach of every section of the country.

Last year's convention, held in Omaha, was well attended and the enthusiasm of the beemen was high. For several years past similar interest has been shown and there is every reason to expect a very successful meeting again this year.

There are many successful honey producers in the east and the attendance should be larger than where there are few local beemen within a short distance of the meeting place. Although a number will travel a long distance to attend, it is always the local group which makes up the bulk of the audience.

Niagara is one of the wonders of the world, and those who have not seen the falls should take advantage of the opportunity to combine a sightseeing trip with the big bee meeting this year.

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¶If your order is for $50 at the prices shown, deduct 5%; if $100, deduct 10% in ordering tin or glass containers or both together.

¶Prices subject to change without notice.

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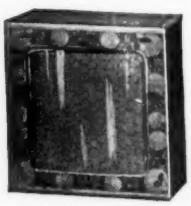
5 lb. pails, 50 in carton, wt. 27 lbs.	Y66	2.90	2.95	3.10	3.10	3.10
10 lb. pails, 50 in carton, wt. 45 lbs.	Y69	4.30	4.40	4.60	4.60	4.60
5 gal. cans, 16 in carton, wt. 54 lbs.* Write for prices in carloads.	Y625	5.10	5.10	5.10	5.25	5.25
½ lb. jars, 24 in carton, wt. 12 lbs.	Y630	.72	.78	.72	.68	.74
1 lb. jars, 24 in carton, wt. 17 lbs.	Y631	.88	.98	.90	.90	.92
2 lb. jars, 12 in carton, wt. 14 lbs.	Y632	.60	.66	.60	.62	.62
3 lb. jars, 12 in carton, wt. 18 lbs.	Y633	.65	.72	.67	.67	.67
5 lb. round glass pails 6/c wt. 11 lbs.	Y635	.52	.58	.52	.56	.54

2½ lb. square glass pails 12/c, wt. 15 lbs. stocked at Lynchburg only, $ .79.
5 lb. square glass pails, 6/c, wt. 11 lbs., Y637, stocked at Lynchburg only $ .64.

*Can only be shipped 16/c. Write Sioux City for bulk prices.



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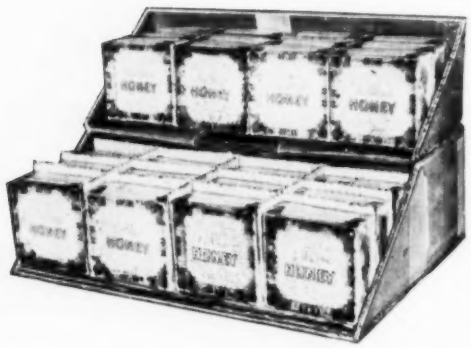

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RELATIVE HUMIDITY AS A FACTOR IN HONEY PRODUCTION

By ROY LITTLEFIELD

WATER vapor or humidity is a very important constituent of the atmosphere. Scientists tell us that it has great influence on the development of storms and on the growth of all plant life. It is also a very important factor in the health of human beings. In literature on apiculture it is seldom mentioned, which seems strange, as it plays such an important part in the production of honey. Not that an increase in humidity always indicates an increase in production as many times the contrary is true.

Plant Life

In plant life humidity is at times very beneficial and at other times it is detrimental. It condenses and forms rain which waters the plant, but it prevents more or less the escape of water from the plant through transpiration. It acts as a blanket to prevent loss of heat from soil and vegetation, but also by absorption and reflection prevents much heat from reaching the soil and plants. It increases and prevents the loss of hygroscopic and capillary water in the soil, but it also prevents more or less the evaporation of free or surplus water from the soil.

As the amount of moisture in the air and soil varies at certain times and in certain places, plants have become adapted only by developing structure and devices to overcome certain conditions. Thus plants that grow in a humid region where moisture is plentiful and transpiration slow, usually have large leaves and a small root system, while those in an arid region where moisture is scarce, have small leaves or other contrivances to prevent the loss of moisture, and a large root system. As many of our honey plants are not natives of this country and are not adapted to our conditions, they thrive best when conditions are similar to that of their native land.

Alfalfa, a native of the warm dry country of Media, south of the Caspian Sea, thrives best when the air is warm and dry. High humidity is always injurious to the plant, especially when the temperature is also high. Here in Iowa during last season [1940] a few weeks of warm humid weather in July turned the alfalfa fields from a dark green to a yellowish green. The bright blue blossoms, which were just beginning to open, faded in a very short time.

Sweet clover is a native of eastern Europe and Asia. It was first cultivated in the same general region as alfalfa, south of the Caspian Sea. It thrives well in both a semi-arid and humid region, but prefers a dry atmosphere. In Iowa during the past two seasons it ceased blooming a few weeks earlier than usual, due to the wet humid weather.

Red clover is thought to be a native of the same region as alfalfa. It was not grown by the ancient Greeks and Romans and was very likely first cultivated in the region south of the Caspian Sea. It thrives well when humidity is high and the temperature is low, but when humidity is combined with a high temperature the plant is injured.

White and alsike clovers are both natives of the moist temperate portions of Europe. They thrive well in a climate that is cool and moist. Hot dry weather is injurious to these plants.

Nectar Secretion

As temperature and moisture are important in plant growth, they are also very important factors in nectar secretion. The range of temperature which plants can endure, is very wide, but that in which most plants become active and cease to be active, is from 32 to 122 Fahrenheit*. The range of temperature in which plants secrete nectar, is much smaller, with secretion perhaps greatest when the plant is most active and at a time when it is receiving the most nourishment. As all plants are not equally active at the same temperature, nectar secretion will vary some due to the plant. In sweet clover, secretion will start around 70 and slow down around 90 Fahrenheit. Should the relative humidity be low and the sun shining, the starting point may be in the sixties, as was the case in many places the past season.

*Plant Studies—John M. Coulter.

When the plant becomes active, water is needed, and an enormous quantity is used throughout the season. While some water is used by the plant in building tissue, etc., a much larger amount is used in carrying food and in transpiration. The amount used by the plant for nectar secretion is small, perhaps only a few hundred pounds per acre during the season, while the amount thrown off in transpiration will run into hundreds of tons. Thus moisture in the soil, if not in excess, is very essential to the plant, not so much for secreting nectar as many think, but as a food carrier. However, moisture in the air is different and not as desirable, as it interferes with transpiration. Quoting from "The Green Leaf," by D. T. MacDougal: "When the atmosphere nears the saturation point with water, water loss or transpiration is very slow. A leaf loses water very slowly during the coolness of the night or on a foggy dewy morning, and practically none during a rain." Thus as the humidity increases, the plant becomes less active, which is not due to the temperature being too high or too low, but because the leaves are unable to throw off the surplus water.

The effect of plant inactivity on nectar secretion is very interesting. During the past two seasons, I have been experimenting with a number of colonies of bees on scales and a LaSalle Thermo-Humidity Meter. Both temperatures and relative humidity were recorded morning, noon and night; also the daily gain of the colonies at the close of each day. Throughout the month of July, 1939, only sweet clover was available for the bees. The flow would increase when the humidity went down and the temperature up, and it decreased when the humidity went up and the temperature down. It also decreased when the temperature went much above 90. On the 12th of July, the gain was not as large as it should have been, as the temperature was very high. The bees ceased working during the hot part of the day, but were active again toward evening when the temperature went down in the 80's. By the close of July, much of the

yellow sweet clover had quit blooming and the daily gain of honey then was not as high as at the beginning of the month.

In 1940, the experiment was more complicated, as the bees had white Dutch clover to work in addition to sweet clover. With both plants available, they would work white clover when the humidity was rather high then shift to sweet clover when humidity decreased and the temperature became too high for white clover. At the close of July, the flow almost ceased, not from lack of honey plants as sweet clover was plentiful, but due to the high temperature and high humidity. Not much white clover was available at this time, as the hot dry weather had dried up most of it. The correlation between honeyflow and temperature and humidity was not at times what it should have been, due to the fact that transpiration is affected some by wind and light and relative humidity did not always decrease on some mornings as rapidly as others. Also temperature always varies some in places, especially if the sun is shining and there is no wind.

It is well known to most beekeepers that in some places the honeyflows are much heavier than in others. It is doubtful, however, that any place itself has any influence on the flow, but the increase in honey is due to the low humidity and proper temperature that prevails there at times. While cool nights and warm days have been thought to increase the flow of nectar, it has been found in a study of nectar secretion at the Pacific States Bee Culture Field Laboratory, that cooling the plant at night and warming it during the day, did not increase the flow. Therefore, the increase in flow is no doubt due to the low humidity, as when cold air is heated it expands causing a great increase in the capacity of the air for water. The greater the variation in temperature between day and night, the lower is usually the per cent of relative humidity. Also when the nights are cool and the days warm, there will always be a period of time when the temperature will be right for nectar secretion, while if it is always cool or always warm, the temperature may always be too high or too low. In the high altitudes, the nights are cool and the days are warm. The relative humidity decreases rapidly with altitude and practically disappears at the height of ten miles. Inland, or far from the ocean, the relative humidity is usually lower than near a body of water, and the temperature is usually higher. In the high latitudes, conditions are somewhat similar to high altitudes. The nights are cool and the days are warm. The per cent of relative humidity is usually low during the day.

Honeyflows will vary greatly at times from place to place, due to great masses of air which move across the country. While some of these will pass over in a short time, others will linger for days, weeks and months. The length of time, or cycle, in which they occur; the source, whether wet or dry, will determine our honeyflows from season to season, or over a number of years. As weather is known to go in cycles of around ten or eleven years, many places that once yielded good crops, now produce little or none, while others are now producing large crops. During the last ten years, sweet clover and alfalfa have become important honey plants, not only in Iowa, but in states far to the east where rainfall is much heavier. Many of us who have kept bees during this time and have harvested large crops of honey from sweet clover, were much surprised to hear that a man like A. I. Root, was not very enthused over this plant when it was first introduced in his state. Our astonishment may not be so great in the next few years, if the relative humidity should then average as far above normal as it has below normal during most of the time the last ten years. In 1935 and 1937, when it was normal to slightly above, there arose almost a calamity among honey producers in the Midwest. Beekeepers and their bees were on the move and migratory beekeeping was the talk everywhere. The situation perhaps would not have been so serious had not the previous hot dry years, 1934 and 1936, killed all the white clover and other plants that might have yielded well during those years. The tachinid fly was accused of taking the nectar, but on days when the humidity was low there seemed to have been plenty for both bees and flies.

NOTE:—This article will be concluded in the September issue.—Editor.

— ♦ —

CRIMSON CLOVER

Central Missouri can grow crimson clover, and I am satisfied most of the northern half of this state can also grow it successfully. This year's crop is the third I have seen growing here. As it withstood last winter's abuse, it should be able to take any average winter. It should come into wider usage, for it is an ideal cover crop for orchards and a soil builder to be turned under ahead of corn or other crops planted at that season.

Crimson clover requires moist ground to become established, for it germinates easily and if not covered deep enough will dry out and die. Here it can be sown any time from June to September, and it will get through an inch of covering. The seed is large—near the size of common millet—and I believe the newer grain drills can be shut down to sow it. I seeded fifteen pounds to the acre and finished August 28. It was tall enough to hide a rabbit when winter set in—and that after going through four days of near zero weather on November 11 which killed apple trees and berries alike. We had no covering of snow during the winter, but January was wet. The planting withstood the nightly freeze and thaw of February and March without any loss. It seems to grow well in cool weather and forms a thick, branched crown or stool from which many stems arise. They will average a dozen, and I have counted over forty from a single stool. When the stems start, they all come at once and rise quickly. I was in the field in May 1 and found three stems with the blossom just beginning to open. On May 8 they were all up and the field was a blaze of deep crimson. It was a thrilling sight. The field edged the main highway, and motorists by the dozen stopped to inquire what that "stuff" was.

Each stem bears a flower bud that first shows as a bunch of crimson and rapidly elongates from one and a half to three inches. Fertilization is progressive from the base to the top. The corolla tubes are very short, each bearing a single seed. The nectar flow is evidently very heavy, for there were moths and butterflies and bees swarming over the flowers constantly.

The honey is light, but not white. It has a heavy body. Fortunately, this is one plant that, where it grows, fits into the beekeeper's pattern. Fruit was scarcely out of bloom when this crimson clover began, and it was not out of bloom when blackberries began. When the blackberries were two-thirds gone, the yellow sweet clover began to yield. I was in the field May 24 and saw a few bees searching out belated blooms of the crimson clover.

This plant will not be used for the main honeyflow. It blooms too early and does not last very long. But it rings the bell as that in-between helper which relieves feeding and erases the lethargy of the hive. I have never had bees build up as rapidly as they did this past spring.

L. F. Childers,
New Franklin, Mo.

THE BEE BUSINESS

Notes From a Southern Trip

By M. G. DADANT

OUR trip through a part of the queen-rearing country left us with two distinct impressions— (1) the procedure in a particular section is largely affected by the leader or leaders in that section; (2) individual quirks have varied somewhat procedure and equipment of the bee breeders.

In the ensuing articles we shall endeavor briefly to outline queen and package procedure as we saw it demonstrated.

Breeding Queens

By this time most of the South is past the days of black bees. Though some black stock may still remain, it is largely in different sections from the heavier commercial breeding areas. There is, therefore, generally a more or less uniform stock from which to shake Italian package bees.

But when it comes to queen-rearing stock, it seems to the writer that the difference among the various Italian strains is quite pronounced, and explainably so. For the most part the breeder concentrates on furnishing a queen that will transmit to its offspring those characteristics which he deems most important. So we have some breeders who rely on actual colony performance in their own apiaries, whether it be qualities of color, uniformity, honey gathering, brood regularity, ability to populate the colony rapidly, or numerous other factors.

Oftentimes renewal of these characteristics is sought by the infusion of fresh blood from some other well-regarded breeder and occasionally from imported stock (though that source has been dried up of late). Often, also, the breeder profits by the return of some of the best producers from some of his customers.

Regardless of other items, the object is to select breeding queens— not only queens which have had good records themselves, but, more important, queens whose daughters show those characteristics most sought after. This is the reason probably why many breeders prefer to make their own selection rather than infuse into their stock reputedly high grade stock from other sources. The only danger here lies in the question of the ability of the breeder to judge the quality of his stock. For instance, the moot question of the cause of supersedure of queens in package shipping can be only partly judged by the southern breeder without recourse to his northern buyer. Even then, the method of handling in the North may have all to do with the success or failure of the queen and package.

But our breeder has selected his breeding queens by his methods, and we are ready to carry the procedure a step further. Naturally the breeding colonies must be kept fat with food and pollen in order that the eggs of the breeding queen may be prime and not undernourished.

Egg Selection

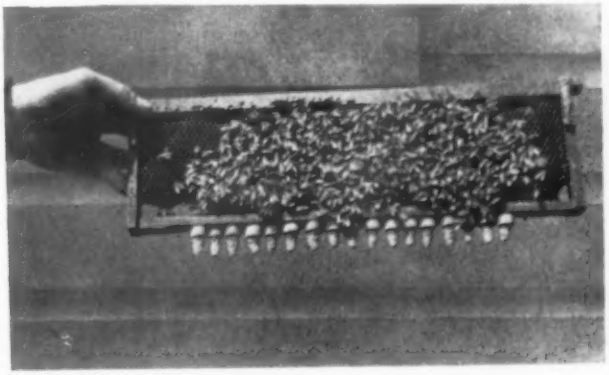
Time was when the selection of larvae for rearing queens was pretty much a hit-or-miss proposition. Breeders are now pretty well agreed that a larva less than a day old is much superior to, gives better acceptance than, and produces better queens than an older larva. Doolittle could see no difference in larvae an hour or two old and those up to thirty-six hours old. After that time, he said, it appears that the bees stint the food somewhat. But our breeders seem pretty well agreed that larvae less than a day old are to be preferred.

Transferring Larvae to Cells

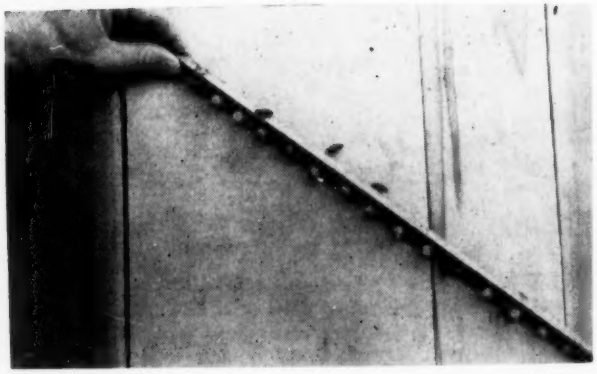
Commercial queen-rearing calls for masses of queens and masses of cells; everyone uses wax cell cups. Some are used with two thicknesses of wax to the cup (two dippings), some with three, and we saw one breeder who was making his cells as he went, with just one dipping into the liquid wax and an immediate transfer from the cell forming stick to the cell bar—a sort of dip, spot, dip, spot process, as it were—fifteen or more cell cups to a bar. Most builders use also wood cell cups outside so the cells may be more easily stuck to the cell bars; though not a few stick the wax cups direct to the cell bar.

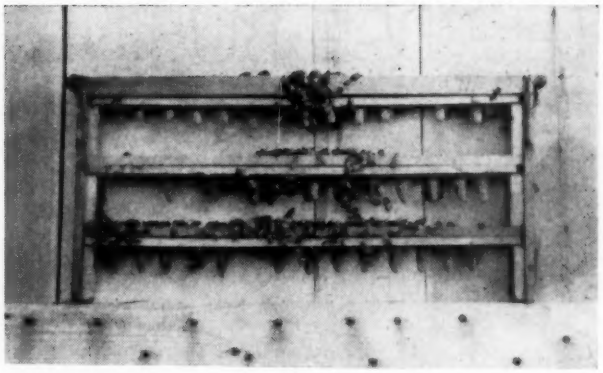
Though usually the commercial grafting tool is used to transfer the larvae to their new home, we found a number of variations of this tool to suit the needs of the individual breeder—some with a wider cup to lift the larvae, some with a handle with a particular crook to fit their individual procedure.

When the grafting season com-



Left—Typical feeder used on starter colonies. Right—Shallow frame with row of cells beneath.





Left—Row of cells after one day in a starter colony. Right—From starter to finished cell.

mences, royal jelly generally is secured by making a colony queenless and allowing it to begin queen cells. From this batch of queen cells the first lot of jelly is secured. Afterwards, cells are always on hand to supply such jelly as is needed. Though royal jelly may be accumulated and put into cold storage for later use, we saw no evidence of this procedure. Usually the jelly was obtained as needed, thinned with a little water, and a small quantity placed in each cell with a jelly spoon, just at the time the grafting was done. All this, of course, had to be done in a warm place if the weather was just the least bit inclement. Every queen-rearing yard has its grafting house, with plenty of heat for the tender larvae, perhaps too much heat for best comfort of the operator.

Grafting is a skill. A quick eye and a clear eye to select the proper age larvae, and agile fingers and hands to make the transfer without the least damage to the tender beginning of a new colony head. The commercial breeder can do it, but many prefer to share the work with their wives, whose nimble fingers and sharp eyes can in an hour transfer as many as five hundred of these tiny grubs to their new beds of jelly in the newly formed artificial cells

To make easier the work of finding the right size larvae to use, some breeders confine their breeding queens to three dry combs, inserting one of these as needed, and taking them out in rotation as the eggs hatch and the larvae become the proper age.

In one yard, the queen was confined to five baby nuclei frames, one inserted each day. Others provided necessary room in the breeding colony as needed but relied on memory and a quick eye to select proper frames for grafting.

Swarm Boxes

Swarm boxes are also called starter colonies and grafting colonies. It is into these prepared colonies that the newly grafted larvae in queen cells are first introduced. At least this is the usual procedure, though we found one breeder who omitted the swarm box and introduced his cells direct to the cell builders. In such cases, the rows of unoccupied queen cell cups were first given to these cell builders for a few hours so that they would shine the cells up, and get them ready for occupancy. Then when the grafted cells were given to the builder a maximum number were accepted.

Probably the chief difference between the swarm box and the cell starter is in the manner in which they are made, though we believe that these names to some extent are used synonymously by some of the breeders.

The swarm box is in reality a strong swarm of several pounds of bees to which is added a comb or two of pollen and honey but no brood. The success of the swarm box, cell starter or finishing colony depends on its being strong and well-fed. The swarm box has a screened bottom which can be reduced to conform to weather conditions, and the bees are kept confined. The freshly grafted larvae are introduced into these swarm boxes, left for twenty-four hours and then removed to the cell finishers. Some breeders replace such cells as are not accepted by the swarm boxes—a sort of consolidation of satisfactory cells to be given to the cell builders. Others merely transfer frames and bars from swarm box to cell builder. Swarm boxes are often used for starting several batches of queen cells, until the swarm becomes demoralized and has to be broken up.

The cell starter method consists merely of isolating a strong colony from its brood and queen. Usually the brood and queen with enough bees to protect the brood are moved just back of the old colony, and they are properly closed or screened in. The batch of prepared cells is now introduced into the original colony which is without its queen. They proceed to accept the cells. In twenty-four hours the batch of accepted cells is removed, and the whole colony is re-united. Variations in the procedure are found; but, in the main, the procedure is as described.

We found considerable difference in the number of cells given to swarm boxes or starter colonies. The number varied from 15 to 20 cells, in one instance, to as many as 150 cells in another. It seemed apparent that those breeders who practiced the "baby nucleus" methods of queen mating, which we will discuss later, were usually the ones who entrusted the largest number of cells to their swarm boxes.

But all alike left these cells in charge of the swarm box or starter colony, only for a day when they were transferred to the "finishers" or "cell builders."

In no case were cells left in the swarm boxes for nine days and then transferred to nursery cages, later to be introduced as virgin queens into the mating nuclei. Such a procedure is apparently not adapted to large scale queen-rearing.

Cell Builders—Finishers

Cell builders must be powerfully strong colonies in two stories and better acceptance may be assured by careful selection of such colonies as will most readily accept, nourish, and finish such cells as are given them. Usually colonies are not ready as builders as early as the breeder wishes to use them in this capacity. Necessarily, bees and brood and feed must be added. Scarcity of pollen may at times interfere with adequate care of cells, so feed is given when necessary. Actually, syrup feeders are kept on these builders most of the time, or until the actual flow is on.

Bees and brood may be added from outyards, if precautions are taken not to import any undesirable drones. Most breeders screen out these drones when bees are added to cell builders and rearing nuclei.

Ordinarily a ratio of about fifty to one is maintained between queen-rearing nuclei and cell builders. In other words, for every one hundred nuclei, the breeder wants two cell building colonies. Again, here, there is a wide variation as between differ-

(Please turn to page page 383)

BEHAVIOR OF HONEYBEES TOWARD BROOD INFECTED WITH AMERICAN FOULBROOD[1]

By A. W. WOODROW,
U. S. Department of Agriculture,
Bureau of Entomology and Plant Quarantine

DURING the past few years the attention of beekeepers and research men interested in bee diseases has been directed toward the discovery and perpetuation of strains of bees immune or resistant to American foulbrood. Numerous beekeepers have observed occasional colonies that apparently have recovered from this disease. Investigations of the problem have been reported by Richmond (5), Park (2, 3), and Park, Pellett, and Paddock (4). In 1936 the work also was undertaken by the United States Department of Agriculture in cooperation with the State experiment stations of Iowa, Texas, Wisconsin, and Wyoming.

General observations on the development of American foulbrood within colonies and on the apparent ability of some colonies to recover from the disease have directed attention toward the activity of the bees in removing diseased material from the combs. Park (2, 3) and Park, Pellett, and Paddock (4) have classified colonies according to the degree to which they removed and rebuilt inserts of comb containing scale remains of diseased brood. About 58 per cent of the "presumably resistant" colonies they studied in 1935 and 1936 tore down the cell walls or the entire comb inserts in removing the diseased material. Other colonies removed the diseased material with little or no alteration of the comb. Each type of behavior was accompanied by disease reduction in a certain proportion of the colonies but not in all. Park (3) raised the question as to whether the apparent resistance is due to housekeeping activities of the bees, "as is believed to be the case in strains resistant to European foulbrood, or depends upon physiological factors, or both." He believes that it is scarcely possible for the bees of a colony to clean out the disease through housekeeping activity alone. Mraz (1) observed that the bees chewed out the dead brood in combs after it dried down slightly, ordinarily without disturbing the comb.

As the suggested relationship between housekeeping activities and resistance indicated a necessity for detailed information on the behavior of bees of different colonies toward individual diseased cells, and its effect on reducing infection, investigations of the problem were begun at Laramie, Wyoming, in August 1937, and continued through the active season of 1938.

Method of Experimentation and the Colonies Studied

The behavior of bees toward diseased brood was observed by placing the combs in a measuring frame (fig. 1), noting the exact location of individual diseased cells as they appeared within certain colonies, describing them, and making repeated examinations of the same cells at regular intervals thereafter. Examinations were made at least twice each week, and sometimes more frequently. Colony development was retarded by a comparatively heavy loss of unsealed brood from exposure during the time the combs were being examined. After the diseased remains had been cleaned out, observations were continued on many cells until they were used again for brood rearing. In some colonies all the diseased cells were under continuous observation, while in others the number became so great that only random cells were studied.

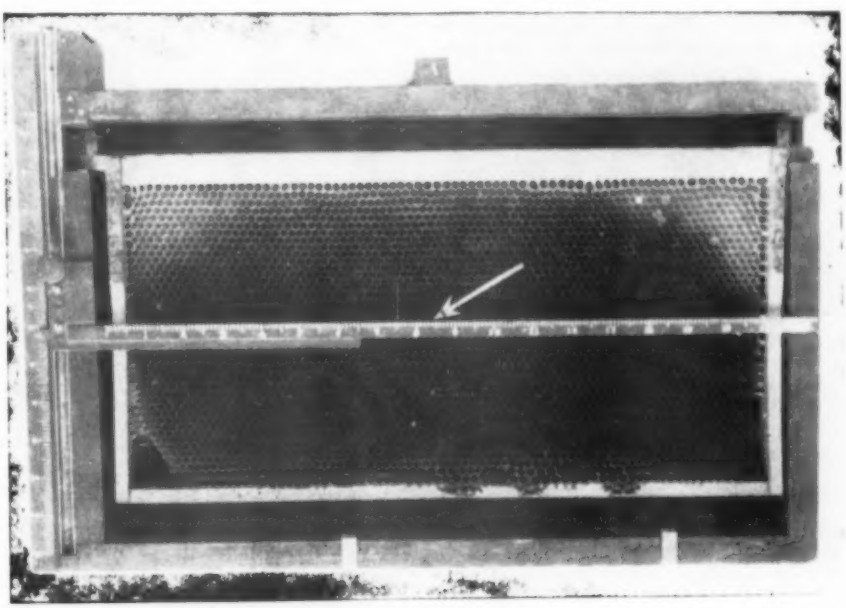


Figure 1.—Cell-locating frames used for establishing the exact position of diseased cells in a colony of bees. The location of the cell indicated by the arrow is 6.0x8.4, comb 6 left, body B, colony 31.

(1) A contribution from the Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture, in cooperation with the Agricultural Experiment Stations of Arkansas, Iowa, Texas, Wisconsin, and Wyoming.

Observations were made on 5 colonies in 1937 and 12 colonies in 1938, studies on 3 colonies covering both seasons. These colonies represented 9 strains of bees having various histories in regard to American foulbrood resistance. Five strains (A, B, C, D, and E) were Italian-Caucasian reared in Texas from queens originating in colonies at the Iowa Agricultural Experiment Station which had shown some indication of resistance to American foulbrood in experiments conducted there during 1935 and 1936. General difficulties with American foulbrood in colonies of the sixth strain, (F) Golden Italians which had been used at the laboratory at Laramie for 2 years in other experimental work, indicated that it was rather susceptible to the disease. The queens of the last 3 strains (G. H. and I) were imported from Europe early in 1937 for testing purposes. Their susceptibility to American foulbrood was not known.

In 1937 the colonies, with one exception (F-280), were maintained as single-story 5-frame units, but in 1938 10-frame hives were used, additional room being provided as necessary. American foulbrood developed in colony F-280 as the result of a natural infection. Disease was produced in the remaining colonies by feeding each 1 liter of sirup made of equal parts of cane sugar and water to which had been added 500,000,000 spores of **Bacillus larvae** from foulbrood scales. This quantity and concentration of spores is ten times the minimum infectious dose found by Sturtevant (6). The inoculated sirup failed to produce disease in three colonies (A-31, C-29, and H-42) in 1937, and a second inoculation was given to these colonies early in 1938.

Time Required for Disease Development in the Brood

White (7) indicated that a month or more was required after death for the brood to assume the thin, more or less dried scale condition. Observations show that a much shorter time is required for this process at Laramie. Nearly all the newly diseased brood found in cells that had been cleaned out was detected 17 to 20 days after the eggs were laid. Following the removal of the cell cappings by the bees, the discolored, melting brood dried down rapidly and passed into a fairly firm scale condition in from 3 to 5 days, but the drying process proceeded somewhat more slowly in cells remaining capped longer.

Most of the diseased brood passed into the scale stage approximately 2 to 3 weeks after being sealed, or 3 to 4 weeks after the eggs were laid. Since infectious material is ingested by the brood during the larval stage, the appearance of diseased brood in the melting-down condition or in the fresh-scale stage represented infection of the larva approximately 2 to 3 weeks previously.

Activity of the Bees in Removing Diseased Brood

Diseased-brood remains were removed by the bees of all colonies under close observation (table 1). Some diseased cells appeared to be neglected entirely in three colonies late in 1937, but except in one colony (F-280) the removal of the remaining diseased brood was completed after the end of brood rearing, and no more disease was found until June 1, 1938. No diseased cells under continuous observation in 1938 were entirely neglected, although observations on some of the colonies were discontinued before all the cells had been cleaned out.

A large portion of the diseased brood was removed while in a soft condition before a hard scale had formed. Many diseased cells discovered during one observation were cleaned out before the next examination, but other cells, particularly in the heavily diseased colonies, were cleaned out more gradually. In such cells the removal began at the outer or head end of the dead brood and progressed toward the bottom of the cell, the small upturned tail end at the base being the last portion removed. This portion of the dead brood seemed to be the most difficult to remove, perhaps because it had more time to dry out and adhere to the cell wall. Sometimes small dried particles of diseased brood remained at the bottom of certain cells for a week or more after the other parts of these cells had been cleaned out. The comb was chewed in removing the dead brood in only a small proportion of the diseased cells.

A fairly large amount of diseased-brood remains was removed from the combs of the badly diseased colonies. Considerable debris consisting of wax, propolis, and what appeared to be pieces of scales accumulated on the bottom boards. This material contained large numbers of spores of **Bacillus larvae.** Since the quantity of the material collected scarcely accounted for the mass of diseased material removed from the combs, the greater part must have been carried outside the hives.

Time Required for Removal of Diseased Remains

The average time required for cleaning diseased cells in the four colonies with a history of resistance (A-58, B-61, C-62, and E-43) in 1937 ranged from 14.4 to 32.4 days. In 1938 this average ranged from 1.7 to 9.8 days. Of all the cells under observation in 1938, 78.7 per cent were cleaned out in less than 7 days, while in colonies with less than 100 cells for the season 95 per cent were cleaned out in this time. The wide differences in the averages for the two seasons may have resulted from the selection of colonies for observation, and from variations in colony composition or external conditions. The averages are rather rough, since they include cells not completely clean at the time observations were discontinued, and since observation intervals varied for different colonies. The averages for some colonies in 1938 (A-58, D-51, G-55, and I-7) would have been higher if detailed observations

Table 1—Data on diseased cells observed in 1937 and 1938

Year and colony	Total diseased cells	Cells containing some remains at end of observations	Cells closely observed	Cells cleaned out	Cells undisturbed	Average time required for cleaning	Cleaned-out cells again producing diseased brood	Cleaned-out cells producing healthy bees
	General observations				Detailed observations			
1937	No.	No.	No.	No.	No.	Days	No.	No.
A-58	188	43	137	96	10	14.4	15	17
B-61	68	16	40	24	0	16.8	0	2
C-62	117	14	54	40	0	19.0	0	0
E-43	438	153	178	26	12	32.4	0	1
F-280	500+(1)	500+(1)	112	29	33	---(2)	0	0
1938								
A-31	3	0	3	3	0	3.3	0	3
A-38	2	0	2	2	0	3.0	0	2
A-58	500+(1)	500+(1)	119(3)	111	0	9.8	14	16
B-5	1	0	1	1	0	3.0	0	0
B-61	23	4	23	19	0	4.7	0	1
C-29	8	0	7	7	0	1.7	0	7
C-62	42	0	42	42	0	4.2	0	38
D-8	46	0	46	46	0	5.8	0	34
D-51	500+(1)	500+(1)	74(3)	67	0	4.6	---	---
G-55	500+(1)	500+(1)	117(4)	116	0	5.3	6	43
H-42	34(5)	0	34	34	0	2.9	---	---
I-7	500+(1)	500+(1)	137(3)	88	0	8.5	3	2

(1) Exact number not determined, but colony became badly diseased before end of season.
(2) Time not given, as observation interval was irregular.
(3) Observations confined to one side only of two different combs after colony became heavily diseased. Detailed observations discontinued before end of active season.
(4) Observations confined to two combs after colony became heavily diseased. Detailed observations discontinued before end of active season.
(5) Queen changed in June; 15 cells in brood of first queen, 19 cells in brood of second queen.

had been continued on them until the end of the active season. There was considerable variation in the time required for cleaning individual cells, even in the same comb in colonies with numerous diseased cells, but no relation could be found between the location of diseased cells and the removal time.

It is uncertain that the spread of disease within colonies depended upon how quickly the diseased brood was removed, but it appears that the amount of diseased material present directly affected the time required for cleaning. For example, the time required for cleaning diseased cells in colonies A-58, G-55, and I-7 increased as they became more heavily diseased, and the time for colonies C-62 and D-8 was reduced as the number of newly diseased cells decreased. The seven colonies (A-31, A-38, B-5, C-29, C-62, D-8, and H-42) that became free of disease before the end of the 1938 season cleaned out their diseased brood quickly, but only a comparatively small number of cells of diseased brood ever appeared in them.

Development of Disease in the Colony

The extent of disease development within the colonies under observation varied considerably. This variation was not closely related to the strain of bees, colony population, or queen vigor. There was more similarity in certain colonies of different strains than in colonies with sister queens. Colonies in which the number of bees had been reduced by disease made little progress in removal, but one of the weakest colonies (A-31) with a poor queen cleaned out its three diseased cells in about 3 days. On the other hand, one of the strongest colonies (G-55) with a good queen became heavily diseased and required more than 5 days for cleaning diseased cells. Another strong colony (A-38), in which were only two diseased cells, cleaned them out in 3 days, while another weak one (A-58), with several hundred diseased cells, required more than 12 days for cleaning after the disease became heavy. After disease became well established, it seemed to spread more rapidly in the stronger colonies, probably because of the greater amount of brood rearing.

Brood Rearing in Cleaned-Out Cells

After diseased cells had been cleaned out by the bees, many of them were again used for brood. Although they were not used for this purpose until they appeared to be completely clean, bacteriological culture tests have shown that some of them still contain spores of **Bacillus larvae.** The rearing of new brood in 166 of these cells without disease developing, however, seems to show that there was little danger of infection from material remaining within these cells. None of the brood in the lightly diseased colonies became diseased in cleaned-out cells, and less than one-third, or 38 cells, of that reared in the more heavily diseased colonies (A-58, G-55, and 1-7) became diseased. In the latter colonies about the same proportion of all the brood died of the disease, indicating the general distribution of infectious material within them. Under such conditions the recurrence in cleaned-out cells can scarcely be attributed to inefficient cell cleaning. The rearing of healthy brood in them seems to demonstrate that the cells were cleaned exceedingly well and that the further spread of disease within certain colonies following primary infection did not depend on the house-cleaning efficiency of the bees. Since the feet and mouth parts of bees in diseased colonies are known to become contaminated with spores of the disease organism, it seems likely that the spread of disease to other brood, including that in cleaned-out cells, was due to the transfer of spores by the house-cleaning bees.

Storage of Honey and Pollen in Cleaned-Out Cells

Many diseased cells also were used for storing honey or pollen after they had been cleaned out by the bees. No cells containing visible American foulbrood scales were ever observed being used for storage, even during a heavy honeyflow. In cases where honey was being stored in a comb with some cells containing scales or portions of scales, the honey was frequently stored and even sealed in adjacent clean cells, but not in cells containing visible diseased-brood remains. Apparently general contamination of the honey of the hive is not accomplished by its storage over American foulbrood scales, as has been commonly believed. Honey stored in cleaned-out cells may absorb some spores of **Bacillus larvae,** but not in sufficient numbers to cause it to become heavily contaminated.

Importance of Disease Removal In Colony Inspection

The diseased cells in the less heavily diseased colonies studied in this experiment were cleaned out so rapidly that most of those found during one examination would not have been evident a week later by the usual colony-inspection methods. The diseased cells found at a particular time represented largely brood recently affected and the activity of the disease only a short time before the brood was examined. Therefore, the appearance of diseased cells within the colonies presented a progressive and changing picture rather than a cumulative one. Consequently, estimates of the degree of infection of a colony based on counts of diseased brood may sometimes be misleading, particularly when only a few diseased cells are appearing. Diseased cells may appear and be cleaned out before they are seen, and when infrequent inspections are made light infections may be undetected. Small particles of diseased brood frequently are present at the bases of cells that are being cleaned out by the bees. They are extremely difficult to detect and identify, and doubtless are seldom seen in ordinary colony inspection. This is one reason why it is so often a difficult and prolonged task to eliminate American foulbrood from an apiary.

It is unsafe to conclude that a colony will overcome American foulbrood merely because the bees are removing diseased brood, for it was removed both in colonies that recovered and in those that did not recover. The removal of diseased material from the cells in which the brood dies does not necessarily indicate removal of all infectious material from the hive. Even when all diseased brood has been removed from the cells, there may remain within the colony unused honey or pollen which is capable of infecting brood reared later. Thus the disease may remain inactive for indefinite periods, up to a year or more, during which time it may be spread to other colonies through manipulations of equipment, etc. To combat American foulbrood successfully the beekeeper must be constantly on the alert for light infections which may be cleaned out by the bees, rather than depend on the infrequent examinations of the inspectors, who cannot find diseased colonies unless dead diseased brood is present when the inspection is made.

Summary

Observations covering a 2-year period were made to obtain information concerning the behavior of bees toward brood remains resulting from American foulbrood infection. Fourteen different colonies were studied, representing nine strains of bees, of varying degrees of susceptibility to the disease.

The bees of all colonies removed diseased-brood remains. Most of the dead brood in the more lightly diseased colonies was cleaned out in less than 7 days. Some cells in the more heavily diseased colonies required more time, and some were neglected entirely for comparatively long periods. The behavior of different colonies in this respect was not clearly related to their resistance. As the number of diseased cells in certain colonies increased, the time required to clean them also increased. No close relationship was found between colony population, queen vigor,

or strain of bees and the rapidity of cleaning cells or the spread of disease within the colonies. The diseased material was usually removed without disturbing the comb.

Many cells in which diseased brood was found were used again for brood and for storage of honey or pollen after all visible diseased material had been removed from them by the bees. Only in the rather heavily diseased colonies did any of the new brood reared in such cells become infected. It appears that the honey would not become heavily contaminated when stored in such cells, although this does not preclude the eventual spread of the disease organisms to the honey, or to the larvae, by the bees engaged in the cleaning process.

As a result of the rapid removal of the diseased brood from the combs of most colonies, the number of diseased cells visible at a particular time for the most part represented only the brood recently affected, and the activity of the disease only a short time before. Frequent inspections are therefore necessary to detect light infections and to prevent the spread of the disease in a colony. The removal of diseased brood in a colony is not an adequate basis for predictions as to whether the disease finally will be eliminated.

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YOUR FRIEND, THE BUYER

In every field of industry, co-operation of individuals and groups and co-ordination of ideas and activities are necessary in order to insure efficiency. In these days of specialization, few individuals care to or, for that matter, are able to carry the burden of production, transportation, sale, and distribution of a given commodity. These various functions are now performed by agencies specifically set up for each such phase of business.

This diversification permits a greater degree of concentration by the individual in his own particular sphere of industrial influence than would be possible if he had to handle details in all spheres. Obviously, such concentration produces results which would be impossible under a less diversified system. And this is as true of the honey industry as of any other.

It will be seen quite readily that for the average honey producer to engage in all the activities necessary to bring his product to the markets of the world is an almost insurmountable task. He has neither time nor facilities for it and must therefore let others act for him. All this is more or less elementary; but in order to rationalize concerning the honey producer's responsibility to other agencies co-operating with him in the honey industry, it is well to bear it in mind.

One of the most important agencies on whom the honey producer must depend is the buyer and warehouse operator. In the first place, the buyer, in going directly to the field, saves the producer the necessity of locating a ready market for the disposal of his goods; and in the second place, the buyer can—and does—keep the producer informed about prices, trends, and general movements of honey. As a matter of fact, the larger buyers and warehouse operators disseminate information gratis, by circulars and letters, at intervals to producers in their districts. Through advertising and publicity carried on by large dealers in honey, markets are being constantly expanded, and the producer consequently receives a share of the benefits. Also, because of a system of grading and classifying by the warehouse operators and shippers which results in a product of standard high quality, the honey producer is assured a favorable reaction by the buying public to his product. Storage facilities are available to the producer who, for various reasons, may wish to store his honey in a safe, clean place; and, at the warehouse, he may also obtain cases and cans as well as other equipment he may require. In short, the buyer and warehouse operator is a sort of clearing house for all the details of the business which the honey producer does not desire to handle or lacks the facilities for handling.

It is not the writer's intention to claim that a buyer and shipper is actuated by purely eleemosynary motives in the producer's behalf. He is in business and naturally must make a profit to remain so. However, the majority of wholesale dealers are constantly striving to better conditions for the entire industry, not solely from a mercenary standpoint (as some of the more cynical may believe), but because, after all, they are human; and, in association with their fellow men, they are as susceptible to the spirit of the golden rule as any other group. They will generally be found willing to go halfway on any reasonable proposal and ready to adjust differences wherever possible. Under our economic system, the wholesaler is a very necessary adjunct; and it may be said that, in the main, he is representative of the honest, worth-while citizen who is doing a service to the community at large and doing it well.

G. S. Painter,
Los Angeles, California.

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BEES GET HEALTH CERTIFICATE

In Oregon, state laws now require all bee colonies to have permits before being moved from one location to another. No charge is made for the permits and they are issued to show that the colonies are free from infectious diseases.

A. Burr Black, state bee inspector, says that all buyers of honeybees in Oregon are entitled to a "certificate of health" for the colonies they purchase. The purchaser should insist on having it, Black adds.

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EXTRACTED HONEY PACKAGE

On June 1, 1941 there was promulgated by the Department of Commerce at Washington, D. C., Simplified Recommendation R156-41 for extracted honey packages. The work of the committee having this in charge is to be commended. In 1927 there were over 65 sizes of packages used for packing extracted honey. This has been reduced to 11 sizes, namely 2, 5 and 8 ounce, and 1, 1½, 2, 2½, 3, 5, 10 and 60 pounds avoirdupois. The list as promulgated has been accepted by a large number of associations, producers, distributors anl consumers. It appears to us that a further forward step would be to eliminate many of the styles now in vogue and settle on not over three or four styles for each size, preferably only one.

CAN HONEYFLOWS BE FORECASTED

By R. G. MACLACHLAN

IT can be said right away that flows cannot be forcasted by any rule of thumb, or universal formula, but it is another thing to say they cannot be forecasted at all. Only one must get away from the notion that most depends on bloom-time weather. Bad weather then can spoil a flow, but perfect weather then cannot make one unless plants are in harvest condition. It is a question of knowing when they are in harvest condition. As plants in condition and those out of it often look just the same that may seem impossible. And to make it possible an understanding of some fundamentals of plant life is necessary. One must consider plants long before they come to bloom; sometimes months or even years before.

The first fundamental is that plants do not live from hand to mouth; roots and leaves gather from soil and air, but what they gather is not passed on direct to the parts needing food; it is first stored, and then distributed. Any plant tissue may serve for temporary storage, but permanent storage has its own receptacles; bulbs and tubers are instances. Trees store in the sapwood of trunks and branches. This storing may go on a long time before use. Trees putting out spring foliage can only do so by using food stored the season before; trees bearing fruit usually need a whole year and often more for storage to make the fruit. Beeches have been known to carry heavy stores for eight years and then use the lot in one great seeding. Forest trees often only seed at intervals of years because years are needed for previous storage. Research hitherto has left honey out of the account, but it is reasonable to hold that it follows the same rule; and the first step in learning to forecast flows is to understand this. What is given as nectar must first be stored, over weeks, or months or years.

The next fundamental is to understand the difference between a growing condition of plants and a harvest condition. Plants grow, and growth culminates in storing. Thus pines in Europe are found to grow through April, May, and June, reaching the height of summer wood formation in July, and the **beginning** of reserve storage. Growth goes on again in August and September, forming late wood and buds, and **then** storing reserve material. Growth and storing are thus parts of the same process. In a similar way, growth leads to the reserves to be later used for nectar. But during bloom some cessation of growth is needed to put plants in harvest condition, so that the reserves will be used for nectar instead of for new wood. If factors favoring growth are too strong, this check on growth may not take place, and the flow may be lessened.

In some plants total cessation of growth is obvious at harvest time, as in wheat and oats; in other plants growth only slackens. Fruit trees are pruned to that end. In trees not pruned other means of checking growth can be used to induce fruit. In a garden near by is an orange tree that had never borne fruit in twenty years. Then the owner thought to run a fine saw-cut through the bark of the trunk. That season it bore a hundred big oranges. And in honey production natural conditions need to be such as to cause a harvest condition in plants at bloom time.

These are the two fundamentals in honey production: storage to make nectar possible, and the harvest condition—or check on growth—to induce secretion. But the question will rise, how are this storage and this harvest condition to be detected?

Here we must remember a few things. Honey is three-fourths sugars; sugar, in turn, is akin to starch. In plants, starch is the storage form of sugar, and sugar is the circulating form of starch. Detecting storage in the plant thus means detecting the presence of starch. Other things are stored as well, but here we need only to think of starch, so great is its bulk by comparison with other stores.

Happily the chemical test for starch is very simple. In the case of field flora, like clover, it is less simple than with trees, and needs two or three days per sample, and the use of methylated spirits, iodine and chloral hydrate; but for trees only iodine, very much watered down, is used. Pure starch, in contact with weak iodine-water, turns a very dark navy blue, practically black, with a fleeting sheen of violet. This gives a standard, and the degree of starch in the tissue is shown by the degree of blue.

My experience of starch testing has been confined to various species of eucalypts, growing in the southeast region of Australia, and anything I say has only a general application elsewhere. Species differ considerably even in one locality, and in different seasons. But the starch test has value in enabling one to follow the inner condition of trees, with regard to growth and storage, the year round. Here, one of the first steps is to find out the **normal** limits of growing and resting times in species. In Australia this is a work just beginning to be done; in older countries there is likely to be more data; in any case it is important to know what is **normal** at anytime of year, for in any attempts at forecasting flows one has to learn to allow for all departures from the normal. These may not be so frequent, or so important, in countries where hard, prolonged winter frosts compel a dormant state, or where trees lose their leaves and are dormant for that reason, as where trees are evergreens and the climate permits growth at any time of year. In such cases growth and rest have all the year to wander round in, and if they lose their ordinary routine they may be long in recovering it. They may rest when normally they grow, and that may make them grow when normally they rest, and bloom time may find them bent on growing to the loss of honey harvest.

To find out the normal for the time of year is, therefore, important in any country. The maximum starch index can only be found out by rest time tests. A tree resting has its starch stored, but if growing some or all of its starch will be turned to sugar for circulation and miss the iodine-water test. Tests for storage need to be made during resting times. Bloom time is normally one such rest period, and if things are all right the bloom time test will show stores at their height. So far as experience tells with eucalypts a starch index showing black means a heavy flow, a dark blue index means a good flow, light blue a light flow, and greyish blue probably no flow at all. This is the test at its simplest. But it is not always so simple as that. Rather the interpretation of the test is sometimes difficult. Taking a starch test of trees is always easy. Remove a little bark, bore out a little sap wood, drop a little iodine-water on the sample and the degree of blue shows at once. But sometimes just what it means will puzzle one. The actual test takes only a minute or two, but

its interpretation may keep one pondering for weeks.

If one knows one's flora the interpretation is often as simple as the test itself. If trees are in harvest condition at bloom time, the test will show actual storage, and be an index to what can be spared for nectar. That may be much or little, and the degree of blue in the sample will say. But when trees are not in harvest condition, but in a growing condition instead, weighing probable stores against probable growth expenditure, to find what is left for nectar, needs the consideration of two or three factors. Some recent rest-time test may give one knowledge to go on; apart from that, there are to consider (1) the time since last flow, (2) the total rainfall since last flow, and (3) the seasonal normality of the rainfall.

The **time** factor is often most important. Eucalypts may flower normally every second year, but for various reasons a year may be missed, or bad weather may prevent a flow, so that it may be three or four years between blooms. If the species normally yields well in two years, three or four years will mean a heavy banking up of stores. (Australian migrants commonly reckon on this.) But untimely rains too near flowering time may set the trees growing, with a marked lowering of the starch index, through starch being converted to sugar for circulation. It may **all** go that way, if growth is vigorous. And yet the double time since last flow may mean such a weight of stores that trees can bear a two-way expenditure, on nectar **and** new wood. With light or moderate stores, spending on new wood at bloom time means markedly less honey, or none at all. Normally one-way spending is enough —new wood **or** nectar, but the calculation is sometimes easier to make after the event than before it. Still, knowledge of the history of one's flora helps a lot.

As regards rainfall since last flow, the point is that perennials can carry stores a long time—as long as ten years—before spending them on nectar or seed. It is not unusual, outside the good honey localities, for eucalypts to hold off a flow for many years. It is a good one when it comes. Roughly it will be in proportion to growth, and that, in turn, is proportioned to rainfall. (This applies, perhaps, to country where rainfall is oftener too little than too much.) But in calculating the effect of rainfalls, all the time since last flow needs to be remembered, not merely the last year. The year of the bloom may be dry, and yet the total make a high average, with benefit to the flow.

What is often more important, however, than the total rainfall is its seasonal normality, or regularity. I can best illustrate this by Australian examples. Modern beekeeping began here about 1880, and for about forty years was characterized by the **regularity** of its harvests. But the last twenty years **irregularity** has been their most striking feature. And there has been a corresponding change from regularity to irregularity of rainfalls. Normally this southeast region of Australia is winter rainfall country. Australia is largely a tropical country, and the line between summer and winter rain zig-zags across, well south of the Tropic of Capricorn, from Indian Ocean to Pacific. Until twenty years ago most of the rain south of this line fell between April and October; the last twenty years, as often as not, most of it has fallen between November and March. This has quite upset the routine of tree life. The normal main growing time of trees here is between May and August, with a later short growing time about November. This means that normal rest times coincide with most bloom times. But if winters are too dry, rest may take the place of growth, and that means that, given out-of-season rain, growth will take the place of rest, and growing may coincide with bloom, throwing trees out of harvest condition. This clash of growth with bloom spoils honeyflows unless the banking up of stores has been very heavy. As already said, growth at flowering time makes the starch index a doubtful register of stores, so much having gone into circulation as sugar. This uncertainty can only be corrected by calculation from the three factors already mentioned—time, rainfall, and seasonal normality of rainfall.

One reading this will see that any attempt at forecasting flows entails a considerable study of one's flora in certain fundamental aspects. The whole study is still in its experimental stage, and writing for readers not familiar with the flora and climate familiar to myself, it is not easy to convey right impressions. But what I say may serve as an introduction to the study, which apiarists may follow out in connection with their own flora. It is an extremely interesting study, which in time can be made valuable from the standpoint of honey harvests.

I have not had very much experience of ground flora, which in my locality comes mostly into beekeeping for pollen supply. My observations make me think it follows the same broad rules as tree flora. Only ground flora is annual and trees are perennial. For storing I have noticed a good long growing time is best, and for harvest soil and weather conditions slackening growth. Failures in ground flora have come either from too short a growing time, preventing storage, or from too wet a soil at bloom time turning the plants' energies to growth instead of reproduction. I think anyone using ground flora in a very variable climate will notice these things, but they may long pass unnoticed in a climate with one year just like another. I always found bad seasons and unusual seasons good for plant study in this connection, though often no good for anything else.

Muckleford Railway Station P. O.
Victoria, Australia.

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GETTING RID OF LAYING WORKERS

When a queenless colony develops laying workers it is usually difficult to introduce a queen without first getting rid of the worker layers. For disposing of them I have tried several of the recommended plans, for instance shaking all the bees off the combs at a distance from hive's location and letting the bees fly back, the idea being that the layers will be left where the shaking was done. Sometimes I have repeated this shaking several times and yet had layers in the hive. My belief is that there may be a number of the workers laying and even though all could be found and destroyed others might develop the laying habit and continue filling the combs with worthless eggs.

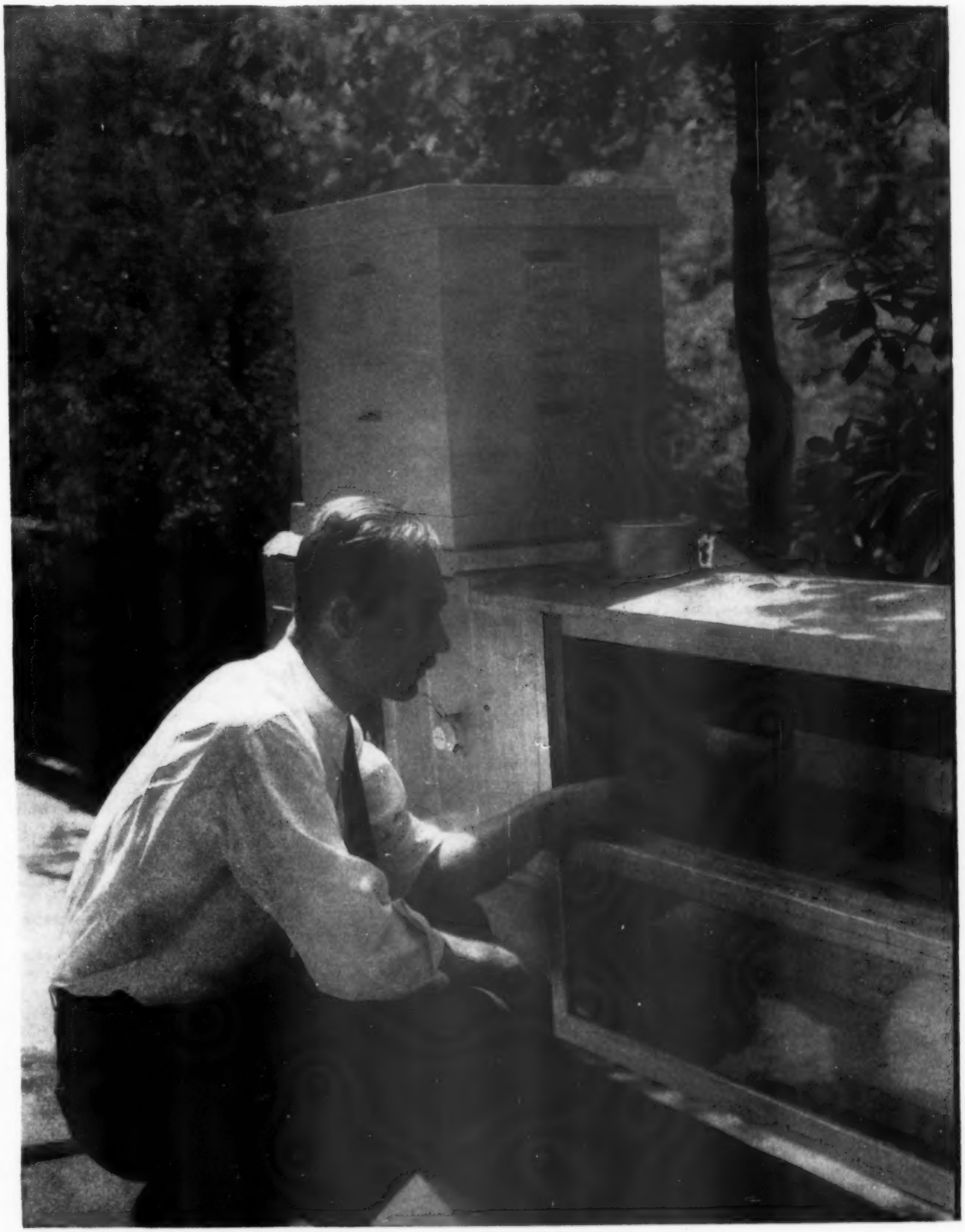
Once when looking for the queen in a nucleus where it was time for the young queen to begin laying I found eggs a plenty but no queen could be seen. The hive was examined again a couple of days later with the same results, no queen in sight. While holding a comb where most of the eggs were, I noticed a worker bee backing into a cell as if depositing an egg. Glancing over the comb I saw another one doing the same thing, then a third one and finally a fourth one, all laying at the same time. Some of the cells had several eggs.

My present practice for disposal of colonies with laying workers as also those with infertile queens is to unite them with strong queenright stock by placing the defective colony on top with paper between. Where infertile queens are present they are destroyed before the uniting is done. Otherwise they may continue laying for some time, thus increasing the amount of drone brood in the combs.

G. N. Ranum,
Wisconsin.

NECTAR SECRETION

Up until a comparatively short time ago, the subject of nectar secretion had been explored somewhat sketchily, considering its importance. The excerpts here, grouped with the articles by Mr. Maclachlan and Mr. Littlefield in this month's issue, should show the direction, if not the extent, of thinking on this topic. The gentleman below, carefully checking honeyflow measurements, is James I. Hambleton, in charge of the Division of Bee Culture, U. S. D. A.



FRANK C. PELLETT, The Bee World, December, 1923

IT is surprising that so little attention has been given to the problems of nectar secretion. Until very recently scant notice has been paid to the variations of the honey plants under different environmental conditions. It is doubtful whether botanists have long been familiar with the fact that a plant will secrete nectar freely under certain conditions and not at all under others.

Certain plants were known to be valuable for honey production and beekeepers assumed that they would produce wherever they might be found. An example of this idea is the buckwheat, which is generally grown as a farm crop in parts of New York, Ontario and surrounding territory. Because buckwheat is a good source of nectar in this region where conditions are favorable, it is very generally planted in the Mississippi Valley by beekeepers who expect to find it equally valuable in the Middle West, where it seldom yields to any extent. For many years I have heard buckwheat recommended for planting in Iowa for the benefit of the beekeeper, yet after a careful investigation in all sections of the State I found only one case where buckwheat could be credited as the source of an important yield of honey and there was some reason to doubt even the one. Bees do work on the buckwheat plant to some extent in Iowa, but the results seldom show to any extent in the hives.

In central New York, buckwheat is the principal source of nectar, and large crops are the rule. In this region it is common to find from 200 to 400 colonies in a single yard, and those who have tried the experiment of dividing their apiaries into smaller numbers and establishing outapiaries, insist that they did not get sufficient increase in yield to pay the extra cost of operating. In that region there is much humidity in the atmosphere, and the soils are inclined to acidity. In general, it may be said that where buckwheat does best clover is not to be depended upon, and where clover is a reliable yielder buckwheat is likely to fail. There are neighborhoods, of course, where both yield nectar, for some soils are acid, and on these the buckwheat will yield, and other soils are sweet and clover demands such a soil.

J. E. Crane, of Vermont, writes that in sixty years he has had only two crops of buckwheat honey on clay soil. He further states that this crop does best on light or sandy soils. Perhaps the explanation may lie in the fact that the lighter soils are more likely to be deficient in lime in his locality.

The clovers demand conditions almost the opposite of those under which buckwheat reaches its maximum yields. Conditions, however, which are favorable for alsike are not so good for the sweet clover (**Melilotus**). Alsike will grow on soils with a much smaller lime content than is required by either white clover or sweet clover. Apparently alsike also requires more humidity in the atmosphere for best results than is the case with sweet clover. All the clovers thrive on rich limestone soils. Warm days and cool nights are necessary for heavy yields of nectar not only from the clovers but from many other plants as well. It is for this reason that most plants yield nectar more freely in the higher altitudes than elsewhere.

As nearly as I can determine, sweet clover reaches its maximum in nectar secretion in the plain region of North America where the days are hot, the nights are cool, and there is little humidity. I have previously outlined the region from Sioux City, Iowa, northward into the prairie provinces of Canada as the ideal region for sweet clover. Under the name of sweet clover are included both the white and yellow varieties (**Melilotus alba** and **M. officinalis**) and the Hubam clover which is an annual variety of the common white form.

In those regions all the conditions mentioned are combined. The soil is rich, there is ample rainfall during most seasons, and the difference between day and night temperatures is usually sufficient to insure a good flow of nectar. In this section in neighborhoods where there is ample acreage of sweet clover grown, yields of from 100 to 300 pounds or more of surplus per colony are not uncommon. The yields obtained there emphasize the need of a knowledge of the requirements of every important honey plant. When this is known, it will only remain to find a location where the particular plant desired is grown in sufficient acreage to insure success in beekeeping. As buckwheat yields in central New York, or sweet clover yields in the Dakotas, so will other plants yield when the necessary conditions are supplied . . .

From the above it will readily be seen that we need far more information concerning the requirements of plants. A beekeeper is likely to waste his time in trying to establish sweet clover in a region where buckwheat or heather are at their best. Likewise an attempt to establish heather on alkaline soils is likely to result in disappointment. The sourwood tree is one of the finest sources of honey in the southeastern states, yet it will not succeed except on acid soils. Not only must we learn the soil requirements of the plants in which we are interested, but we must learn what combination of temperature, humidity, altitude, and moisture will favour the heaviest honeyflows.

It is very probable that the regions where a plant gives the best returns to the beekeeper will be the place where it is of greatest value for other purposes. This being the case it should not be difficult to improve the bee pasture of a neighborhood by introducing into the agriculture the plants which give the largest yields of nectar. Sweet clover is proving to be the best legume so far discovered for forage in the Dakotas, where it is most valuable for the bees.

A careful study of the factors controlling nectar secretion may bring to light information of great value to the farmers as well as the beekeepers for after all, their interests are mutual.

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ANNIE D. BETTS, The Bee World, March, 1924

NECTARIES are, as is well known, groups of glandular cells situated on or close to the essential organs of the flower (extra floral nectaries, such as those on the leaves of **Prunus laurocerasus**, the common laurel, being for the present neglected). Opinion differs concerning their function, some maintaining that they produce nectar primarily in order to attract insects for purposes of cross-pollination; while others (of whom the present writer is one; see Bee World, Vol. I., p. 210), hold that it is more probable that the main function of the syrupy nectar is to draw water away from the anthers by osmosis, thus permitting them to liberate the pollen more quickly after wet weather. Insects, by removing the nectar, accelerate this process, since they thereby assist in keeping up the concentration of sugars in the nectary cell-sap. From the point of view of the plants profit-and-loss account, in fact, nectar (as accumulated on the surface of the nectary) is an unwanted waste-product; and has only secondarily been adapted to serve the purposes of "publicity" and attract pollen-transporters.

Whichever view be taken as to the primary function of nectaries, it is plain that production of relatively large quantities of sugar in one particular region of the plant must depend upon biochemical factors, possibly of a very delicate and complex description.

This opinion is confirmed by the known fact that soil conditions,

chemical and physical, greatly affect the nectar-yielding capacities of plants. But soil conditions are not the whole story, as every beekeeper knows to his cost when unpropitious weather coincides with what should be main honeyflow. The fact is, the problem of nectar secretion has never been properly studied because it demands a range of knowledge beyond any one investigator's scope. It demands, if it is to be solved, the combined efforts of a botanist (expert in both physiology and ecology), a biochemist, a physicist, and a meteorologist, at least; and one or more of them must also be well acquainted with the study of the soil (from the physical, chemical and biological points of view) and with the work that has been done on symbiosis. Recent research has shown that a great number of perennial plants live in a state of mutual accommodation and assistance (symbiosis) with a fungus. This fungus grows upon, and often in, the root-system of the plant; and is in many cases a sine qua non for healthy existence. I suspect that the symbiotic fungi of our honey plants will prove to have much indirect influence upon their powers of nectar-secretion. I was first led to take this view by remarking the striking conditions that prevail in the case of a plant, the nectar-secretion of which is notoriously capricious and uncertain —namely, the common heather, **Calluna vulgaris.** It has been found* that the heather plant (other Erdcaceae, I believe, show a similar phenomenon) is permeated by a symbiotic fungus, the presence of which is absolutely necessary to the development of the plant. A seedling germinated under sterile conditions remains minute and rootless; if artificially infected with the fungus (under suitable conditions) it will start to develop normally. In nature, the fungus is present on the seed-coat, and the seedling is infected as it germinates. The inability of heather to grow on lime or chalky soils seems to be due to the inability of its symbiotic fungus to flourish in such soils.

Some other honey-plants are similarly more or less dependent on fungi (or in some cases—the clovers, for example—bacteria) for assistance in their nutrition; and it is obvious that all such symbiotic organisms may affect the secretion of nectar, and must be considered and studied as part of the mechanism concerned in it. The protozoa of the soil, as well as its physical and chemical characteristics, may also enter into the problem, which is thus seen to be an exceedingly complex question; quite apart from the complications induced by the effect of the weather preceding and accompanying the nectar-flow . . .

*M. Cheveley Rayner, The Ecology of Calluna vulgaris (New Phytologist, XII, No. 2, Feb., 1913), and Obligate Symbiosis in Calluna vulgaris (Annals of Botany XXIX, Jan., 1915). Also later work by the same author.

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JOHN H. LOVELL, American Bee Journal, December, 1921

. . . The effect of altitude on the secretion of nectar has lately been the subject of frequent discussion, and it is proposed in this paper to briefly review conditions prevailing in Alpine regions. It is a problem of great practical as well as theoretical interest to the beekeeper. As nearly the same conditions prevail at high latitudes as at high elevations, it is desirable to compare the floras of these two regions. In both Alpine and Arctic districts the plants are exposed to low temperature and intense light. At an elevation of a mile or more the air is less dense, or thinner, and intercepts less sunlight than in the plains. As we advance in the summer toward the North Pole the days become longer and the earth receives more of the sun's rays than farther south. In both cases, also the cold gradually increases until plant life practically disappears. Mountain regions differ chiefly from northern regions in that the pressure of the air is less in the former than in the latter.

The two regions agree again in that both have short summers, and vegetation is obliged to "hurry up" in order to flower and fruit before winter . . .

At this point, before inquiring into the agencies affecting nectar secretion, let us establish the fact that flowers at high elevations and high latitudes tend to secrete nectar more freely than in opposite situations. Mueller states that in the lowlands the spur of an orchid (**Platanthera solstialis**) was only about a third filled with nectar, but that in the Alps it was over half full. According to Bonnier and Flahault, **Silene inflate,** one of the pink family, was much richer in nectar at an elevation of 5,895 feet than at an elevation of 1,300 feet . . .

In California, Dr. Phillips was informed by several prominent beekeepers that with an increase of altitude the sages yielded larger crops of honey. According to Mr. Frank C. Pellet, in this state, the sage flow is reported to be much more dependable at higher elevations. Mr. M. C. Richter, the well-known author of the Bulletin on California honey plants, writes, "There is a great deal of evidence pointing to a more profuse nectar secretion at higher elevations." A beekeeper at Grand Junction, Colo., in June, 1919, wrote to the author that while three of his apiaries were getting barely enough nectar to keep them alive, three others 1,800 feet higher and 35 miles away, had filled the supers, and he was extracting a good crop. "In the lower valleys alfalfa has not amounted to much for some years, and most of the honey has been secured after August 1."

On the effect of altitude on the secretion of nectar by alfalfa, in Kansas, some very interesting observations, have been made by A. V. Small, of Augusta. He writes: "Where the river valley of the Kansas River is above 1,000 feet, alfalfa in Kansas is one of the major honey plants; but, where the valley is below 1,000 feet it is one of the minor honey plants, practically ceasing to yield between 800 to 900 feet." The valley at Topeka has an elevation of about 900 feet and here alfalfa is valueless as a source of nectar. Fifty miles westward, Manhattan, on the same river, has an elevation of 1,000 feet, and bees work on alfalfa freely. The 1,000-foot elevation line runs from Atchison, in the northwest corner, in a very irregular series of curves and loops to Sedan, near the south border line. Small says that he has checked the effect of altitude on nectar secretion back and forth across this line and the conclusion given above holds with remarkable accuracy.

Why does alfalfa in eastern Kansas cease to yield nectar between 800 and 900 feet, but becomes a good honey plant above 1,000 feet? As it would seem that so small a difference in altitude could not so greatly affect nectar secretion, it is of much interest in this connection to record a similar case in eastern Maryland. The following observations by Dr. Phillips on the secretion of nectar by tulip-tree have, I believe, never before been published: "Tulip-tree grows in association with chestnut, oak, walnut, hickory, maples and beech, and sometimes with scrub pines. Its chief importance as a honey plant is in Tennessee, Kentucky, the Carolinas, and the Ohio Valley. In Virginia and Maryland it is perhaps less abundant, although near Washington, above the fall line, it is sufficiently abundant to give a regular honey crop. We never secured a crop from this species when our apiary was below the fall line, in the city, or at Arlington, Va., or College Park, Md."

The "fall line" is the line separating the Coastal Plain from the Piedmont Plateau, or the line where the tide water rivers cease to be navigable. In Virginia this ascent ranges from 100 to 200 feet, but in eastern Maryland it is probably less. It is noteworthy that in the higher part of the city of Washington tulip-

tree yields well, but not in the lower part.

The obvious explanation of the secretion of nectar by alfalfa and tulip-tree at higher altitudes, in the localities mentioned, would seem to be the decrease in atmospheric pressure. At Alpine heights the evaporation of water vapor by leaves is hastened by the thinness of the air. But it may be urged with much force that a rise of only one or two hundred feet would make little difference in air pressure. As a matter of fact 100 feet would cause a decrease in air pressure of only a little more than eight-tenths of an ounce per square inch. Moreover, under favorable conditions, the secretion of nectar by alfalfa is largely independent of air pressure, since in Imperial Valley, California, 200 feet below sea level, it yields immense crops of honey. In Kansas the good alfalfa pasturage for bees is restricted to the narrow stream valleys, while the uplands, no matter how great their elevation, yield little nectar, owing to the small rainfall. A beekeeper at Oshkosh, Neb., on the Platte River, writes that although sweet clover and alfalfa are abundant at an altitude of nearly 4,000 feet, the air is so dry that little nectar is secreted, and that his experience in beekeeping has been a failure. The small amount of experimental evidence available is not very satisfactory; but, so far is it goes, it points to no relation between atmospheric pressure and nectar secretion. But according to the 29-year record at Clarinda, Iowa, a low barometer apparently favored honey production. Any definite conclusion until more data is obtained, seems, therefore, impossible. It is by no means improbable, assuming all other factors to be favorable, that a slight change in air pressure might start nectar secretion, for example, when the cells of the nectary are overfilled with water and the elastic walls of the cells are under great strain . . .

Let us next consider whether a high latitude is favorable to an increased secretion of nectar. With the exception of a rarified atmosphere essentially the same conditions as to a large amount of light and low temperature prevail in northern as in Alpine regions. The many hours of daylight permit the plant to manufacture food for a much longer time than further south. Experiments in illuminating plants with electric lights show that they do not require a rest at night, and that with more light they can be forced to do more work. In the spring and early summer, and in late autumn, the nights are colder than the days. This is often also true of nights in mid-summer. "The North," says Sladen, "is particularly well adapted for beekeeping, as the warm days and cool nights favor nectar secretion, while the long working day increases the crop . . . In the case of no honey plant is the effect of latitude so well shown as in white clover. In Michigan, Wisconsin and southeastern Minnesota it is a very reliable honey plant. (See American Honey Plants, p. 277.) A beekeeper in Fillmore County, Minnesota, writes that a complete failure of white clover has not been known in that locality for 20 years. It is a much better honey plant there than in either Illinois or Iowa, where good crops of honey are secured on an average only about two years out of three. Farther south, white clover is a very unreliable source of honey, although it may occasionally yield a large surplus . . . High altitude is evidently favorable to an increase in nectar secretion. But the number of species of flowers in Artic lands is much less than in Alpine regions; for example, 60 genera of plants are known in the Alps which do not occur north of the Arctic Circle . . .

Numerous chemical analyses show that sugar accumulates in plant tissues at low temperatures . . . In explanation of the accumulation of sugar it has been suggested that starch is converted into sugar more rapidly than it can be used by the plant at a low temperature. If a warmer temperature follows, as when a warm day follows a cool night, nectar secretion is greatly stimulated, since there is a surplus of sugar available, and the warmth renders the membrane of the nectary more permeable.

It is well known to beekeepers that cool nights and warm days are more favorable to nectar secretion than a uniform temperature. According to the 29-year record of honey production at Clarinda, Iowa, the largest amount of honey was stored on days having the widest range of temperature . . .

In general, throughout the plant world, a check in vegetative growth, or of the foliage and stems, favors the production of flowers. The girdling of an apple tree hastens its blooming, and the same result may be obtained by root-pruning. Many cultivated vegetables, growing in a damp, rich soil, do not flower as early as when grown in a dryer soil. A check in vegetative growth renders a larger amount of food available for the production of flowers. The dwarfing of Alpine plants, which is the result of the general conditions at high altitudes, probably, therefore, favors the production of more and larger flowers, and a more ample secretion of nectar.

J. A. MUNRO, American Bee Journal, July, 1931

FOR North Dakota, and to a large extent throughout the Great Plains region, where sweet clover is the main nectar yielder for surplus production, the months of July and August may be considered as the main nectar flow period.

Properly cared for colonies make the most rapid and appreciable gains in hive weight during those months. It is then that the important nectar yielding plants are in bloom to the fullest extent and most colonies are in proper condition for gathering.

In this study several factors have been briefly considered in their relation to the amount of honey produced by a hive of bees on scales. Although the amount of data on hand might justify the working out of correlation figures, practically nothing has been done in that direction. This paper includes only a review of the main factors as probably affecting the colony on scales, together with observations made and conclusion drawn.

In a study of this kind there are in general two main types of factors to be considered. The factors which belong to "weather" include rainfall or precipitation, the amount of sunshine, temperatures, wind direction and velocity, and so on, all of which could not be conveniently considered in a brief paper at this time. The factors included under weather may be considered as variable or fluctuating. Factors which have to do with bees, their condition, the nectar yielding plants and the soil on which they are grown may for all practical purposes in this study be considered as fairly constant.

During the seasons of 1927 and 1928 daily weights were recorded of a hive of bees on scales in the experiment station apiary at Fargo, North Dakota. Each season the colony selected for this purpose was normal and apparently of average strength as compared with the other colonies in the apiary. Except for daily weight readings, the scale colony was given the same care and attention as the rest of the hives in the yard. All colonies were provided with supers for storage as needed, and aside from that very little care was necessary. So far as could be ascertained, no swarming occurred during either season.

The type of soil in the vicinity of the apiary and for a radius of several miles included the Fargo silty clay, Fargo clay, and Fargo clay alkali phase, upon all of which sweet clover thrives and grows well. Most of the

(Please turn to page 384)

Boneset

DEPARTMENTS

THIS AND THAT • • FROM HERE AND THERE

BEEKEEPERS

Meet the Brashiers, of Birmingham, Alabama. Roy is a patternmaker, Mrs. Brashier, the homemaker, and they are both beekeepers.

A little farm run on the side where they can try out the new legumes and honey plants, a few moderate sized outyards, enough nuclei to do a little queen-rearing, and an active interest in making their local beekeepers' association successful, and in helping the bee inspector make the best job possible—these are some of the outside activities of this jolly couple.

It would be hard to find a better example of the happiness that comes of busy, happy activity. Their faces show it, don't they?

POLLEN AND POLLEN TRAPS

Circular No. E-531 of the United States Deparment of Agriculture, "The Use of Pollen Traps and Pollen Supplements in Developing Honeybee Colonies," by C. W. Schaefer and C. L. Farrar, of the Division of Bee Culture, Madison, Wisconsin, describes experiments in trapping pollen from colonies and feeding it to the needy colonies in connection with other substitutes. Results show that the highest production of young bees comes from cakes of pure pollen alone.

The next highest production comes from honey plus cakes of soybean flour and 50 per cent of pollen; and even with a percentage of 12.5 per cent of natural pollen and balance soybean flour and honey, the rate of growth of the colony is satisfactory, whereas with honey alone it is definitely unsatisfactory.

Every beekeeper should be interested in getting a copy of circular E-531 which says very definitely that it pays well to collect pollen and feed it in combination with soybean flour during the dearth of pollen in spring. The bulletin gives detailed drawings of the making of pollen traps, instructions for placing them, and for their care.

—♦—

RAUCHFUSS

This is a recent snapshot of Mr. and Mrs. Herman Rauchfuss, Sr. taken in front of his shop. They are both well and spry. He enjoys "talking bees" as much as ever and is ready and willing to help others with their shop or yard problems.

Ben M. Knutson.

JOHN HARMS OF ILLINOIS

Readers may be interested in the story about my grandfather, John Harms, Sr., of Dolton, Illinois, who at eighty-four attributes his long life to keeping bees. Discouraged and failing in health at seventy-five, he adopted his father's hobby of beekeeping. He found it an all-absorbing interest and soon his two colonies had increased to four. Now nine years later his twelve hives keep him active.

He does his own work, collects his own honey and reads all he can find on bees and their habits, and he is as agile as a thirteen-year-old boy as he sprinkles his swarming bees with a garden hose, then climbs a sixteen foot ladder to cut them down from a nearby sumac. He says, "I never feel dizzy when cutting down a swarm, and the bees don't sting—they know I am their friend."

He wants to make beekeepers of all his friends, he shows his hives to all visitors for the bees are the secret of his happiness. "Bees," he says, "show me that living and working are still worth while."

Helen DeWalt,
Pittsburg, Pennsylvania.

—♦—

AN ODD HIVE

I cannot remember the name of the beekeeper who fashioned the hive shown in these pictures, but in my inspection work in Indiana, they were found in White County near Monticello. The man's father had built the hives years before.

The frames are triangular, the hypotenuse forming the bottom bar. The bottom board is slanting so that bees in winter dropping from the cluster will roll out and not block the entrance. The frames are hinged to the bottom board and open like pages in a book. They are not removable. To inspect the hive you open the side and front, and turn the pages (frames). Note this in the picture showing the open hive.

Benj. H. Wilkins,
New Augusta, Indiana.

HONEY PUBLICITY PROGRAM

In our June issue we were able to give a partial report of the honey publicity program being conducted for the American Honey Institute by Steve Hannagan. That report was very gratifying, but does not begin to cover all of Steve Hannagan's program for honey during the first quarter of the year.

The writer had the opportunity of sitting in on a detailed report given by Murray Martin of the Steve Hannagan organization. This report was truly astounding. Information about honey is being carried all over the U. S. A. through articles and short paragraphs furnished to newspapers and other publications that are alert and keen for facts to pass on to their readers. Some of the largest newspapers in the country have published some of these articles and the number appearing is increasing constantly. Millions of copies of publications have carried the story of honey in one way or another to consumers throughout the land. There is no question that information of this kind to the consumer is bound to have a definite effect on the use of honey.

The American Honey Institute, since its organization, has been doing work of this kind. However, the Institute's facilities for contacting newspaper syndicates was limited. The new publicity program is doing a job for the beekeeper that is needed and will undoubtedly show results in the future.

The beekeeping industry should bestir itself and get concretely behind the Institute. If this program is to be continued, it must have the financial support of producers as well as of all other branches of the honey industry.

L. C. Dadant.

♦

NAPOLEON

THIS MONTH'S COVER

BEFORE the coronation ceremonies, December 2, 1804, Napoleon made most careful preparations. He personally supervised all plans and the minutest details were not overlooked. The pompous uniforms of dignitaries, solemn ecclesiastical robes of the clergy, glittering jewels of graceful and elegant court ladies presented a picture which was rarely excelled and according to eye-witnesses a sight never to be forgotten. In all arrangements the ubiquitous golden bees played a predominant part.

The great portico, walls, aisles, galleries and ceilings of the historic Cathedral of Notre Dame were literally strewn with conventional bee designs. The carpets over which the procession marched were interwoven with golden bees. Thousands of workmen hustled for months to decorate the walls and ceilings, affixing swarms of bees. They were interrupted in their activities only when the Vicar of Christ, Pope Pius VII, entered the edifice on the day of ceremonies.

The Emperor was dressed in a manificient coronation robe, a huge purple velvet mantle hanging on his shoulders, as depicted by Lefevre. The robe and mantle were profusely "seme" with heavily embroidered golden bees; so was the white satin dress of Empress Josephine, likewise the pillow on which she knelt. The vestments of the grand dignitaries and the cushions on which the crown, sceptre and Charlemagne's sword were carried were richly ornamented with bees. The State paid 1,123,000 francs for the robes, crown and tiara of the imperial couple. The cost of the coronation sword, with several embossed bees on its shaft, was 82,000 francs.

The two old thrones at Fontainebleau and the Tuileries palaces were thoroughly renovated. The fleurs-de-lis of former France were banished and thickly studded golden bees took their places on the walls of the throne rooms and the long, richly flowing velvet canopies. The upholstery of the coronation coach and the silver trimmed harness of horses were also densely ornamented with figures of bees.

The Corsican upstart, however, could not adjust himself to the sublimity of the occasion. During the solemn and brilliant triumphal march, the weightly mantle hung so heavily on him that he occasionally stumbled. His ungenteel manners often revealed themselves. When he wished to call the attention of his half-uncle, Cardinal Fesch, who walked next to him in the procession, to some occurrence, he poked him in the ribs with Charlemagne's sceptre. Passing his older brother, Joseph, he nodded to him with a broad grin and muttered, "Joseph, if only our father could see us now!" He was fully conscious of the great parody so skillfully staged.

All in all, the coronation and the subsequent splendor of the First Empire was just as much an apotheosis of the strutting occupant of a snatched throne, as a glorification of these modest members of an industrious community. Never before or after was there a greater tribute and reverence paid to the bees than by Napoleon.

"Winged warriors, rush upon that man!
O busy toilers, noble clan
For duty and virtue arduous
With strong golden wings, keen darts of flame
Swarm round that dull foul thing of shame
And hiss, 'For what hast taken us'?"
Victor Hugo—"The Imperial Mantle."

Dr. Bodog F. Beck.

♦

INTRODUCTION OF QUEEN BEES

"The Introduction of Queen Bees," by L. E. Snelgrove, is the first book devoted to this special manipulation. The appearance of a book of more than 200 pages devoted entirely to queen introduction marks a new record in beekeeping. The author is the well-known English beekeeper and the author of "Swarming, Its Prevention and Control." By devoting an entire volume to one special subject, he is able to treat his material very thoroughly and to provide for his readers an extended review of of what has been written previously.

The large numbers of queens which are lost every year when introduced to strange colonies certainly warrant a full discussion of the subject of queen introduction. As Snelgrove states, "Frequently beekeepers themselves are unaware of their failures."

Different conditions for introducing laying queens and virgins are suggested as follows:

"It is a condition favorable to success in the introduction of a laying queen that brood in all stages, or at least eggs and young brood, be present. Her environment will then be consistent with her presence, she will at once be encouraged to lay, and the continuity of the life of the stock will not be broken. The case of a virgin queen is different. In natural circumstances, except in cases of supersedure, a virgin queen is not found in a stock containing eggs or young brood. When a virgin queen is to be introduced, therefore, only sealed brood should be present."

Every method of introduction in common practice is described at length with discussion of its advantages or disadvantages. An entire chapter is devoted to queen cages and their use and every apiary activity connected with introduction discussed fully.

The author appears to favor some of the direct methods to avoid loss of time by the beekeeper and also to prevent the break in egg laying that comes with long confinement of the queen. One such is as follows:

"Dequeen the stock. Take the new queen by the wings and dip her into a cup of luke-warm water, moving her to and fro a few times to insure that she is fully wet. Remove her, and immediately place her amongst the bees on a comb, or preferably put her through the feed hole on to a top bar. Cover the hive immediately and without disturbance, and do not examine for several days."

We recommend the book. It will be a worth while addition to the library and can be read with profit by even the best informed beekeeper.

It is published in London, by Purnell and Sons, but can be ordered from the American Bee Journal at $2 per copy. A few books have been received from the publishers but there is no certainty when the others will arrive.

♦

NEW BULLETIN

A new bulletin, "Zertemasse Bienenzucht," by our old friend, Dr. Enoch Zander, has recently reached our desk. It is in two parts—"Bienenwohnung und Bienenpflege" and "Zucht und Pflege der Bienenkonigin." The two parts are each forty-eight pages in length and are from the press of Paul Parey, in Berlin.

While there are probably some of our subscribers who would be interested in getting copies of these booklets, we could not, under the present circumstances, recommend how soon orders might come through.

AMERICAN HONEY INSTITUTE

Armour and Company, in their full-page, colorful advertisement in the July issue of Woman's Home Companion, had a picture of a ham in colors and the heading, in heavy type, read

For Your Holiday Week-End
Honey-Glazed Baked Star Ham

"It'll be a gloriously easy Fourth for you—if you have a delicious Star ham all ready in your refrigerator! Grand for quick luncheon or picnic sandwiches . . . Or for a delicious buffet supper, serve it with cold sliced oranges. Wrap ham in its inside glassine wrapper and place fat side up in uncovered baking pan. Bake at 325°F. 18 minutes per lb. 45 minutes before done, remove paper and rind, score fat and cover with honey. Finish baking, basting occasionally with honey."

♦

The Spry Spotlight says "Let us plan a Cookie Cruise for you!" and gives a recipe for SHIP AHOY COOKIES, which calls for one-half cup honey.

♦

Irradiated Evaporated Milk Institute puts out a delicious Honey-Butter Cream recipe which calls for one-half cup honey, one-half cup irradiated evaporated milk and one-half cup butter and in their booklet, entitled "Frozen Foods" has a recipe for Honey Parfait.

♦

The latest release from the Sunkist Kitchen contains recipes for Orange Honey Jelly and Orange Honey Bread; and, by the way, have you tried the Orange Honey Cake on page 13 of "Old Favorite Honey Recipes"? It is becoming a great favorite from coast to coast.

♦

A letter from the director of women's activities of one of the metropolitan papers asks for ten copies of "Old Favorite Honey Recipes" for her assistants. She writes, " 'Old Favorite Honey Recipes' is the best we have seen on the subject."

♦

The June issue of Physical Culture contains an excellent article by Jane Randolph whom you will remember as a contributor to Institute Inklings. Her article has the clever title "Nature's Sugar Bowl."

♦

More publicity was given by Dole Pineapple Juice. They have a full-page advertisement, featuring "Honey-Pineapple Juice Glaze Adds Zest to Ham." Then, they have a "Holiday Gem Cup." Also, "If You Like A Nightcap" (and who doesn't?) reading,

"Heat one cup of canned unsweetened pineapple juice to the boiling point, pour juice over 2 tablespoons honey and 1 tablespoon lemon juice. The aroma is something to talk about and so is the flavor. Drink while it's hot and crawl in between the sheets."

♦

The American Honey Institute has been deluged with requests on how to use honey in canning.

♦

"Waffles with Honey Cream Cheese Whip" is a late two-page release by Kraft Cheese Company. A photograph accompanied the release and was used extensively in newspapers throughout the country. "Old Favorite Honey Recipes" includes cream cheese with honey in the sections on sandwiches, salads and desserts. Cream cheese and honey is a delectable flavor combination. The old cookbooks have recipes that call for cottage cheese and honey.

♦

Proctor & Gamble, manufacturers of Sweetex—"The High-Ratio Shortening"—feature the use of honey as an ingredient in Honey Whole Wheat Dough—Honey Fruit Coffee Cake—Honey Fruit Filling—Honey Doughnut Glaze—Honey Nut Topping—Peanut Butter (Honey) Topping—Honey Fruit Coffee Cake—Honey Macaroon Cake—Honey Macaroon Icing—Honey Glaze—Peanut Butter (Honey) Streusel.

♦

CUCUMBERS

Three Recipes by
Mrs. Adam Bodenschatz

Honey Chunk Cucumber Pickles

12 medium sized cucumbers cut in chunks about ½ or ¾ inches thick as desired. Soak in ice water for 3 hours. Drain and make a mild solution of salt and cold water and let stand for 1 hour. Drain well. Use about 5 red sweet peppers. Make the following solution.

Solution:

1 quart cider vinegar
4 cups light honey
2 teaspoons celery seed
2 teaspoons mustard seed
2 teaspoons ground ginger

4 small hot dried peppers cut in very small pieces. Bring to a boil. Add the drained cucumbers and pieces of red sweet peppers—5 or 6 pieces for each jar as desired—and boil 5 minutes.

You may add onions if you wish, but soak them with the cucumbers in the mild salt and cold water solution. Seal at once in hot sterilized jars.

♦

Honey Ice Water Pickles

Several onions
About 1 stalk celery

6 pounds of medium sized cucumbers each cut in 4 to 8 pieces lengthwise, according to size of cucumber. Soak in ice water for 3 hours and drain. Pack in hot sterilized jars. Add 2 or 3 three-inch pieces of celery packed in between the pickles in the center of the jar. Put a slice of onion and a teaspoon of mustard seed on the top and fill jar with the following hot solution. Seal at once.

Solution:

3 quarts cider vinegar
3 cups light honey
1½ cups water
¾ cup salt

Boil well-about 5 minutes.

♦

Honey, Bread and Butter Pickles

12 small sized cucumbers—about 4 inches long
6 small onions

Soak cucumbers in ice water for 3 hours. Slice cucumbers and onions very thin. Make a mild solution of salt and cold water and soak cucumbers and onions for 1 hour. Drain well. Make the following solution.

Solution:

2 cups cider vinegar
1 cup light honey
1 teaspoon celery seed
1 teaspoon mustard seed
½ teaspoon tumeric powder

Bring to a boil, add the drained cucumbers and onions and boil for 3 minutes. Seal at once in hot sterilized jars.

♦

ANOTHER BEEKEEPER

Mrs. C. W. Mussulman, Secretary-Treasurer of the Macon County Beekeepers' Association, Illinois, reports the arrival of their first grandson born to Wayne and Maxine Mussulman on June 12 at Champaign.

Wayne Mussulman will be remembered by a number of Iowa folks as assistant to O. W. Park in apiary and inspection work during the 1940 season. He graduated with honors in bacteriology at the University of Illinois in 1941.

Congratulations to the parents and grandparents!

MEETINGS AND EVENTS

Potawatomi beach, Pokagon State Park, Indiana.

Tri-State Meeting, August 6-8

Indiana-Michigan-Ohio Beekeepers Chautauqua, August 6-8

Pokagon State Park, Angola, Indiana

Program

August 6

Chairman of session—H. R. Matthews, president, Indiana Beekeepers' Association.

A. M.

8:00-10:00—Registration.

10:00—Early Indiana Beekeeping—L. R. Stewart, of "Round-Up" fame, Newport, Indiana.

11:00—Features About the Honey House — Roy A. Grout, Dadant & Sons, Hamilton, Ill.

12:00—Lunch—Pokagon State Park.

P. M.

1:00—The Problem of Airplane Dusting—E. R. Root, Sr., Editor, Gleanings in Bee Culture, Medina, Ohio.

2:00—Queen and Package Shipping R. H. Dadant, American Bee Journal, Hamilton, Ill.

3:00—Symposium—Problems with Package Bees — representatives from southern bee shippers.

4:00—Drawing of Free Prizes.
Some Thoughts of Outapiary Management—M. J. Deyell, Editor, Gleanings in Bee Culture, Medina, Ohio.

5:00—Soft Ball Baseball Game—Indiana-Ohio.

August 7

Chairman of session—Walter E. Becker, president, Michigan Beekeepers' Association.

Music by the Honey Harmonizers (also during the day).

A. M.

9:00—Sixty Years of Michigan Beekeeping — Floyd Markham, Ypsilanti, Mich.

10:00—A System of Management in Commercial Apiaries to Weed Out American Foulbrood—Dr. W. E. Dunham, Ohio State University, Columbus, Ohio.

11:00—Resume of the 1941 Activities of American Honey Institute—Mrs. Harriett Grace, Director, American Honey Institute, Madison, Wis.

12:00—Lunch.

P. M.

1:00—Research on American Foulbrood and Pollen — James I. Hambleton, in charge of U. S. Bee Culture Laboratory, Beltsville, Md.

2:00—Straining Honey in the Honey House—Dr. E. F. Phillips, Cornell University, Ithaca, New York.

3:00—Syposium—American Foulbrood Resistant Stock—Discussion Leader: James I. Hambleton.

4:00—Drawing Free Prizes.
The Vicious Circle in Beekeeping—E. T. Cary, honey packer, Syracuse, N. Y.
Address — Leo Cadd, Commissioner Michigan State Department of Agriculture.

5:30—Soft Ball Baseball (Championship Game) Michigan-Winner from previous day.

7:00—Master of Ceremonies—Jere Frazer, District Manager, G. B. Lewis Co., Springfield, Ohio.
Honey Production Problems, or Why Jack Spratt Could Eat No Fat, and His Wife No Lean — Prof. R. H. Kelty, Michigan Agriculture College, East Lansing, Mich.
Information Please—Conducted by James E. Starkey, Secretary, Indiana Beekeepers' Associaton, Indianapolis, Ind.
Drawing for Special Free Prizes.
Motion pictures in color.

August 8

Chairman of session—Lloyd C. Gardner, president, Ohio Beekeepers' Association.

A. M.

9:00—Problems Encountered in the Production of a 250,000 Pound Honey Crop—Emerson Long, commercial beekeeper, St. Paris, Ohio.

10:00—Why the Present Prices of Honey?—Clifford F. Muth, vice-president, The F. W. Muth Bee Supply Company, Cincinnati, Ohio.

11:00—The Worst Enemy of Beekeeping—Prof. Geo. H. Rea, Cornell University, Ithaca, New York.

12:00—Lunch.

P. M.

1:00 — Maintaining of Reserve Queens and Queen Introduction—Dr. Carl Schaefer, U. S. Bee Culture Station, Madison, Wisconsin.

Entrance fee to Pokagon State Park is 10 cents per person, good for entire three days. To avoid paying extra 10 cents fee, it is necessary to obtain pass at entrance gate when leaving park. Camping fee is 25 cents per day for each tent or trailer. Water and fire wood free.

James E. Starkey, Sec'y.
Indiana Beekeepers Ass'n.

Free Prizes Offered

Dadant & Sons, Hamilton, Illinois.
3—Ten sheet boxes 8½" Crimp-wired brood foundation with hooks.
1—Copy—History of American Beekeeping by Pellett.
1—Copy—American Honey Plants, by Pellett.
1—Copy—First Lesson in Beekeeping by Dadant.
1—Pound box, Cut comb surplus foundation.

G. B. Lewis Company, Watertown, Wis.—Branch Springfield, Ohio.
5—10 frame—Lewis Rot Proof Hives, complete.
Hubbard Apiaries, Onsted, Michigan.
100—Standard Hoffman Brood Frames.
Schmidt's Economy Foundation, Bay City, Michigan.
1—5 pound box thin surplus foundation.
1—12 ½ pound box 8″ plain brood foundation, 7 sheets per pound.
A. I. Root Company, Medina, Ohio.
1—100 Sheet box—3 ply Airco Foundation.
100—Root Triple-lock corner frames.
1—Copy—ABC and XYZ in Bee Culture, by Root
5—One-year subscriptions to Gleanings in Bee Culture.
M. H. Hunt and Son, Lansing, Michigan.
2—Root Jumbo bee smokers.
2—Delphos wire bee veils.
3—8″ hive tools.
Fred W. Muth Company, Cincinnati, Ohio.
20—10 sheet packages Hercules Ironsides wired foundation.
August Lotz Company, Boyd, Wisconsin.
5-100 boxes—Lotz beeway sections.
A. G. Woodman Company, Grand Rapids, Michigan.
3 big smoke bee smokers with shields.
6 smoke engine bee smokers with shield.
3 smoke engine bee smokers.
6 Woodman's original folding wire bee veil.
6—10″ hive tools.

In addition to the above there will be a quantity of queen bees given and prizes of a less serious nature.

Each beekeeper attending should register and receive an identification tag with his name and address on it and serial number to enable him to be in on the drawing for the above prizes. There will be a registration fee of 10c or 15c to help cover the cost of the identification tags and other expenses of the meeting.

A. B. C. Woodman,
Chr. Prize Committee.

♦

Southern Conference, October 21-23

As the time draws nearer for the 1941 meeting of the Southern States Beekeepers Federation, at Lynchburg, Virginia, October 21-23, all southern honey producers and package shippers should begin making plans to attend.

With world conditions as they are, all southern beekeepers should attend this meeting to discuss their problems and prepare the best they can for the conditions they will have during the coming year. No one can predict to what extent the second world war will affect southern bee culture.

As the Lynchburg meeting is the only meeting of the Southern States Beekeepers Federation this year, it should be well attended with representatives from all southern states, northern beekeepers, bee journal editors, supply dealers, representatives of the American Honey Institute and the Federal Bee Culture Laboratories. All these parties are directly, or indirectly, affected and are urged to attend and discuss the problems of the industry, if we are to plan and prepare for the future.

The program committee has prepared an outstanding program with prominent and interesting leaders of bee culture as speakers. There will be a number of interesting lady speakers, with subjects of interest to beekeepers' wives, and we want to issue a special invitation to the ladies to attend. A honey show and a splendid free sight-seeing trip is being planned. Plan now to attend and remember the dates and place, October 21-23, Lynchburg, Virginia.

A. V. Dowling, Pres.

PROGRAM

Tuesday, October 21

8:00—Registration—Convention Hall—City Armory.
9:00—Order of the Day—President Dowling.
Invocation—Elder R. F. Woods.
Welcome to Lynchburg — Carter Glass, Jr.
Response—L. M. Dewey.
Announcements.
10:00—The Ladies' Place in Our Industry—Mrs. R. E. Foster, Gainesville, Florida.
10:15—The Beekeeper's Duty to His Family, His Neighbor and Himself—M. G. Dadant—American Bee Journal.
10:30—The Value of Organization—E. G. LeStourgeon, Editor, Beekeepers Item.
10:45—Song.
11:00—Breeding from Progeny Tested Queens—E. C. Bessonet, Donaldsonville, La.
11:15—Producing Honey in South Georgia—J. H. Girardeau, State Entomologist.
11:30—How Horse Racing Affects Maryland Beekeeping—Geo. J. Abrams, College Park, Md.
11:45—Committee Appointments, President Dowling, Valdosta, Ga.
12:15—Lunch.
1:30—Mississippi Queens—M. S. Fortune, Mayhew, Mississippi.
1:45—What We Know About Your Queens Jas. I. Hambleton, Bee Culture Laboratory, Beltsville, Md.
2:15—Fifty Years Producing Bees—M. C. Berry, Mongomery, Ala.
2:30—By-Products of Our Industry—H. H. Root, Medina, Ohio.
3:00—Bees in Virginia Orchards—A. H. Teske, Extension Horticulturist, Blacksburg, Va.
3:20—Our Interest in Honey—Mrs. Walter T. Kelley, Paducah, Ky.
3:40—Constructive Policies of Southern Conference.
1. Convention cities.
2. Honey Show Advertising.
3. Publishing a Non-Credit List.
4. Membership dues.
5. Permanent Secretary-Treasurer.
7:30—Screen Pictures.
8:00—Apiary Inspectors—P. G. Craddock, Raleigh, N. C., presiding.
Ladies Auxiliary—Mrs. A. V. Dowling, presiding.
Virginia State Beekeepers Association W. A. Caldwell, presiding.
North Carolina Beekeepers Association, F. L Huggins, presiding.

Programs for October 22 and 23 will appear in subsequent issues.

H. W. Weatherford,
Secretary.

♦

National Meeting, November 12-14

Everyone who produces or sells honey should now plan to attend the national meeting, November 12 to 14, at Niagara Falls. Work is going forward on the programs for the sessions. The morning of the second day will be devoted, as usual at the national meetings, to American Honey Institute. T. H. Shield, managing director of the Ontario Honey Producers Co-Operative, has consented to come from Toronto and address the convention on "Increasing the Sales of Honey by Better Packing and Packaging." Steve Hannagan, whose New York advertising agency is directing the Institute's big promotional program, will be present, with Murray Martin, to talk about his year's activities for honey. Harriett M. Grace, director of the Institute, will review her work. If you are interested in the promotion and distribution of honey, **don't miss this session.** Further and more detailed announcements will appear in later issues. Watch for them.

♦

Empire State (N. Y.) Honey Producers, August 16

The Empire State Honey Producers Association will hold their annual field day at Taughannock Falls State Park, on Lake Cayuga, near Ithaca, Saturday, August 16. All beekeepers are invited to bring lunch baskets and enjoy the picnic together at noon. This is an important opportunity for beekeepers to meet each other, to exchange ideas and obtain information valuable to their business. A short business session will be conducted.

E. T. Cary,
Secretary.

♦

Wyoming and Livingston County Beekeepers, August 23

The Wyoming and Livingston County (New York) Beekeepers Association will hold their annual meeting and summer picnic at the beautiful home of Prof. Guy A. Bailey, on Temple Hill, in the village of Geneseo, on Saturday, August 23. An extracting and honey straining demonstration will be given, also a question box. If you have any questions, bring them along; George Rea will answer them. Bring your picnic dinner; coffee will be furnished. Anyone interested in bees is cordially invited to come.

F. G. Benedict,
Secretary.

♦

Clemson College Short Course, August 26, 27

In the last issue of this journal a program for the Third Annual South Carolina Beekeeping Short Course to be held August 26 and 27, at Clemson, was promised for this month. Professor Dunavan announces a tentative program to include talks by J. H. Girardeau, State Entomologist of Georgia; J. J. Wilder, Waycross, Georgia; Professor F. B. Meacham, teacher of beekeeping at North Carolina State College; P. G. Craddock, State Bee Inspector of North Carolina and possibly other out-of-state speakers.

Numerous contests will be included in the short course this year to keep all in attendance on their toes. Professor Dunavan states that such contests as guessing contests, question

contests and handy gadget contests will be held.

Instructive talks by some of the successful beekeepers of the state are being planned.

The writer is planning a honey show to be held during the short course as an object lesson in honey packing and packaging.

E. S. Prevost.

♦

Middlesex County (Mass.), August 30

The Middlesex County Beekeepers Association will meet at 2:30 p. m., Saturday, August 30, at the Woodville apiary of Mr. Tolstrup and Mr. Ryder. On Route 135, half way between Westboro and Hopkinton, a sign will direct you up Spring Street to another sign at the apiary. Dr. Burton N. Gates, chief apiary inspector of the Commonwealth of Massachusetts, will speak on "Beekeeping Trends."

The ladies auxiliary will supply supper featuring steamed corn, hamburger smothered in peppers, hamburger rolls, green salads, cold drinks, ice cream, honey cakes and coffee. Worcester County beekeepers are specially invited to this meeting. Please bring your plate, cup and silver.

A. M. Southwick,
President.

♦

Pennsylvania Beekeepers Picnic, August 23

Geiman's Park, Route 34, between Gettysburg and Biglerville

Program

Elmer F. Reustle, president, Philadelphia, Pennsylvania.

9:30-10:30—Registration and Acquaintance.

Address of Welcome—M. T. Hartman, county agent, Gettysburg, Pa.

Response — E. B. Everett, Muhlenburg College, Allentown, Pa.

Demonstration, Handling and Care of Comb Honey—E. J. Anderson, Extension Apiarist, State College, Pa.

Apiary Inspection Work in Pennsylvania— H. B. Kirk, Senior Entomologist, Harrisburg. Pa.

Roll Call of Counties, Greetings from visitors and supply campanies.

12:00-1:30—Basket lunch, Lemonade and coffee will be furnished free by Adams, York and Cumberland County Associations.

1:30-2:30—Review of Agricultural and Beekeeping Industry in Pennsylvania—Hon. John H. Light, Secretary of Agriculture, Harrisburg, Pa.

Report of Research Work on Resistance to American Foulbrood, and Research on Pollen — Jas. I. Hambleton, In Charge, Division of Bee Culture, Beltsville, Md.

2:30—Games and Contests—E. J. Anderson and several assistants.

Prizes will be awarded to winners of games and contests which are the contributions of advertisers in the Pennsylvania Beekeeper.

Honey Cooking Contest — Miss Mildred L. Adams, Home Economics, Gettysburg, Pa., 4:00 or 4:30. Opportunity to visit the honey plant of E. H. Sachs, near the picnic grounds will be given following the games of the afternoon.

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Kansas State Meeting, August 3

The Kansas State Beekeepers Association will meet at Independence, Kansas, August 3. A good program has been arranged. Come and bring your lunch to the City Park, where we will talk over our problems, and have a good social time together. Tell your beekeeper neighbors and help get out a big crowd. Remember the place and date and report your crop and price you think it should be worth. Also send your association dues, 50 cents.

W. N. Cline,
Secretary-treasurer.

♦

Southern States Beekeepers Federation, October 21-23

Grand Caverns, Grottoes, Virginia, one of the finest caverns in the valley of Virginia, will be visited by convention folks attending the Southern Conference at Lynchburg on October 21-23. Grand Caverns was discovered in 1804 and was first known as Weyer's cave, having been found by Bernard Weyer. Weyer, accompanied by his dog, followed the trail of a ground hog through tangled underbrush to its den at foot of Blue Ridge Mountains. Digging into loose earth, Weyer loosened a shower of rocks and dirt and a black opening appeared in the hillside. He lighted a pine knot with flint and steel; and cautiously entering the cave, he was startled to find a vast room resembling a buried underground city. The news spread and searching parties were formed. With pine torches they penetrated groups of spacious chambers literally overflowing with geologic wonders. Today these caverns have an elaborate system of subterranean flood lighting, without artificial coloring, so the tinting of the geological formations can be seen in its natural beauty.

Complimentary tickets to Grand Caverns will be presented to you by the Lewis-Dadant organization when you arrive in Lynchburg for the convention. The Virginia State Beekeepers Association is making arrangements for free transportation, and local beekeepers are predicting you will long remember this scenic tour.

A. D. Hiett, chairman,
Program Committee.

♦

Annual Vermont Picnic, August 23

The annual picnic and meeting of the Vermont Beekeepers Association will be held Saturday, August 23 at the apiary and residence of Clyde N. Wood, South Woodstock. Mr. Wood's place is on Route 106, 8 miles from Felchville, and 6 miles from Woodstock. There will be signs on the road to direct beekeepers to the meeting.

All interested in beekeeping and their families from Vermont and adjoining states are invited to attend. Interesting speakers, discussions and practical demonstrations of beekeeping practice will comprise the program. Bring smoker for smoker contest and samples of your best honey for judging. Prizes will be awarded. Don't forget the lunch. Meeting starts at 10:00 A. M. Daylight Saving Time.

Charles Mraz, Secretary.

♦

Bronx County (N. Y.), August 10

The Bronx County beekeepers will hold their regular monthly meeting at the home of the secretary, Sunday, August 10 at 2:30. A cordial invitation is extended to all beekeepers and their friends to attend.

The annual clam bake will be held Sunday, August 24. This is one of the high spots of the year for this association. Anyone wishing to join us in this splendid meal and general good time, please get in touch with the secretary, Harry Newman, 3016 Bronx Park East, for details.

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Wisconsin Beekeepers Association, October 29-30

The Wisconsin Beekeepers Association will hold its annual winter conference October 29 and 30 at the Elks Club in Watertown. The women's auxiliary of the American Honey Institute will meet in Watertown at the same time.

♦

Missouri State Fair, August 17-24

The Missouri State Fair will be held August 17-24. The apiary ex-

hibits at the fair have been a real booster for the industry for several years. No state meeting is planned this year but bring or send your exhibits. It is a fine method of displaying beekeeping products and advertising honey.

♦

Texas Beekeepers Association

The Texas Beekeepers Association held its sixty-fourth annual meeting in Huntsville, Texas, June 19-21. The beekeepers were guests of the city and the Sam Houston Teachers College. Dr. Don O. Baird of the faculty was in charge of all arrangements, and the beekeepers were made to feel at home at once and to enjoy themselves throughout the meeting. The laboratory of Dr. Baird had been transformed into a beekeeping museum and it was in this room that the beekeepers spent most of their time. Dr. Baird in his teaching of "How to Teach Science" makes use of the honeybee as one of the best organisms for illustrative work. He had examples of almost every type of observatory hives, most of them containing bees. Dr. Baird's own model which holds eight brood frames in a manner that all of the bees may be seen was the greatest attraction.

A get-acquainted meeting Thursday night had an attendance of about seventy-five. The beekeepers were addressed by T. C. Richardson of Farm and Ranch. Mr. Richardson has long been a friend of beekeepers and has attended most of the annual meetings during the past twenty years. Richardson's topic, "Why We Need Beekeepers" was aptly chosen and was answered in a way few would expect. His address was patriotic, safe and sane and was accepted by the beekeepers with a great deal of satisfaction.

The regular meeting commenced Friday morning, June 20. After the opening ceremonies, a first business meeting was held. A paper on beekeeping in West Texas by T. B. Bownds, Snyder, was read. Mr. Bownds is a school teacher by profession and taught in the public schools of Texas for many years. Snyder is located in what is considered to be central west Texas and in a country where people have not raised bees. Bownds, who in 1918, began beekeeping with the forerunner of 4-H Boys' Clubs, at Rosser, gave a very detailed account of beekeeping in what is commonly known as the Angelo country. In his summary he staes that with the experience of himself and those who furnished data which he used, he is led to believe that the section will give through a period of years as many honey crops and of the same dimension as any locality in the State.

George M. Jeffus, Crockett, an old time beekeeper and nurseryman, gave a paper on the sources of honey in East Texas, this being illustrated by the actual honey plants themselves. To the majority of beekeepers present who came from central and west Texas, this talk was extremely interesting as few had ever seen the plants which were shown as the principal sources of honey, especially of the Trinity River.

The afternoon session began with a notable paper. F. E. Aten, the newest beekeeper in the Aten family which for forty years has been connected with the Texas Beekeepers Association, read a paper entitled "A Future Farmer Beekeeping Project." In this paper he told of what was required for such a project. He gave a history of obtaining the bees which he has and what he has occomplished. This paper was looked upon as being one of the unique papers of the meeting.

The Home Economic Department of the University of Texas has been interested in the use of honey in cookery for about two years. During the past year a project in the use of honey in cookery was taken up and considerable work has been done. Miss Jennie Wilmot, Associate Professor in this Department, has charge of this work. Miss Wilmot read a paper in which she told of their plans, the trouble that they had experienced in getting the project under way and of their expectations for future work. Miss Wilmot had never attended a meeting of beekeepers and to her the work with honey was merely routine. After attending the meeting and visiting with the beekeepers, Miss Wilmot assured the beekeepers that she had become much interested in the project, assuring the beekeepers that with their aid in the supplying of samples next year this project would be continued.

The use of bees in observatory hives in a school room for demonstrating by Dr. Baird is bearing fruit quickly. Two of his former students presented papers. Professor S. J. Stovall, Alamo School, Galveston, read a very detailed paper in which he showed how a colony of bees either in an observatory hive or in a standard hive could be used to great advantage, in creating an interest of children in various lines. It was his opinion that in his school the use of these hives had brought about a greater interest in all school subjects than any other illustrative material. Of as much interest was a paper on bees in grade school work by Miss Maggie Brune of Sealy. Miss Brune teaches a country school. She was so much interested in Dr. Baird's hive that she made one and used it in her one room school in Brazos bottom. She reported that it was easy to get the children to build an observatory

hive and there were always beekeepers from whom combs and bees could be obtained. Of particular interest was the fact that in telling of the use of the hive it was ascertained that the teacher was well acquainted with bees and beekeeping. It was somewhat amusing to the beekeepers when one of them asked her a question, expecting that she could not answer it, only to find that she could answer it and brought out some things that even the beekeeper did not know.

A letter relative to the distribution of resistant queens from J. I. Hambleton, Chief, Division of Bee Culture, Beltsville, Maryland, was read. Also the American Honey Institute, the American Honey Producers' League, and Association were discussed and dues collected.

The annual Beekeepers Buzz occurred at eight P. M. The first part was held in Austin Hall, the oldest still occupied college building in Texas. After several musical selections by the Sam Houston Teachers College Music Department, the beekeepers were taken to the library building where T. W. Burleson talked on the value of bees and their products to Texas. This was illustrated by a colored film belonging to Mr. Burleson. This talk was very much enjoyed by the large attendance both of beekeepers and visitors. Dr. S. W. Burleson of A. & M. College spoke on how bees help the farmer and fruit grower. The Secretary of the Association spoke on why he chose beekeeping as a vocation. At this point the beekeepers again assembled in Austin Hall where refreshments were served.

The final meeting was held on Saturday morning. Miss Myrtle Murray Extension Specialist, spoke on Home Industries and indicated that the greater amount of things made and done in the home the greater would be the prosperty for the country.

A. W. Bulay, Liberty, spoke on beekeeping in East Texas. The last business session was called and Hugh Shofner of Greensville, Texas was elected president; Elbert Clements, Lampasas, Vice-President; the Secretary-Treasurer, re-elected. Greenville was represented by a delegation asking that Greenville be selected as the next meeting place. The beekeepers unanimously selected Greenville for the 1942 meeting. Having finished the program and business the annual meeting of 1941 was declared adjourned by President M. B. Hinton.

H. B. Parks,
Secretary-Treasurer.

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Oklahoma State Fair, Aug. 31-Sept. 5

With space provided for many large display and an unlimited number of small exhibits, the bee and honey division of the August 31 to September 5 Tulsa State Fair is expected to draw a large number of exhibitors from all over the country. The Tulsa County Beekeeper's Association will cooperate with the Tulsa State Fair again in stressing the idea of "raising bees scientifically."

Superintendent of the apiculture division will be J. W. Rice, Tulsa, veteran bee keeper, who has managed apiculture shows for fairs all over the southwest.

"The fair management will do all possible to make exhibit facilities the best in the fair's history, and to give information to those who desire it," Rice explained. "An effort will be made to coach the amateur, and to educate fair visitors on where to buy, and how." Either single jars of honey or large displays to consist of from 200 to 300 pounds may be exhibited. Entries close Saturday, Aug. 16, and judging will begin Monday, September 1, by Prof. C. F. Stiles, of the Oklahoma A. & M. college, Stillwater. Free bee department or general premium lists showing the division of $25,000 in premiums among the 25 fair departments will be mailed to anyone writing the Tulsa State Fair.

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Wabash Valley Round-Up

The Sixth Annual Wabash Valley Beekeepers Round-up is to be held Saturday, August 23rd, at Lakes Park in Paris, Illinois. To you who have attended the Round-up in former years at the home of Lee Stewart, in Newport, Indiana, the Round-up needs no introduction. But you beekeepers who have never attended one of these round-ups have missed one of the season's rare treats Plans have been made to make this meeting the largest of its kind ever to have been held in the Midwest. It is the one day in the year when beekeepers are asked to forget their worries and troubles and make the day one happy occasion. For those who come early a Friday evening luncheon will be held at the Hotel France at 6:30 P. M. A postal card to the host for reservations at this luncheon would be appreciated. The host is Carl E. Killion, 908 Marshall St., Paris Illinois.

The following program has been planned for the Round-up:

9:00 A. M.—Introduction and welcoming selections by the Paris band.

A Round-up welcome by Mr. Geo. A. Bridgeman, mayor of Paris.

Our State Association, by Adam Bodenschatz, president of the Illinois State Beekeepers Association.

The Division of Apiaries and Its Relation to the Department of Agriculture, by Hon. Howard Leonard, director of the Illinois Department of Agriculture.

Honey Can Bring More Money, by

Mrs. Harriett M. Grace, American Honey Institute, Madison, Wisconsin.

The Beekeeper, The Manufacurer, and the American Honey Institute, by Mr. Lewis W. Parks, Pres. of G. B. Lewis Company, Watertown, Wisconsin.

Lunch

1:00 P. M.—Honey Production in the Wabash Valley or 4-H Club Work in Beekeeping, by Lee Stewart, Newport, Indiana.

Address by G. H. Cale, Dadant & Sons, Hamilton, Ill.

Manufacturer's Problems, by Walter T. Kelley, Walter T. Kelley Co., Paducah, Kentucky.

Honey Care and Storage, by Dr. V. G. Milum, University of Illinois, Champaign, Ill.

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Lorain County (Ohio) Beekeepers Association

The Lorain County Association will meet in Avon Lake Park on Monday evening, August 11, at 6 o'clock, with Mr. and Mrs. Perry Taylor as host and hostess. A picnic lunch will be served. Bring your lunch and table service.

Geo. E. Yost, Secretary.

THE BEE BUSINESS

(Continued from page 362)

ent breeders practicing different methods.

One breeder practiced regularly with "packed" cell builders to avoid the possibility of chilled cells through a rapid change to colder temperatures while the cells were being built.

Cells are given to cell builders in various ways. The usual method is on cell bars, transferred from the starter colonies, and introduced to the cell builder in standard sized frames, three bars of about fifteen cells each to a frame and one such frame to a builder, making forty-five cells in the builder at a time; although we found one breeder using two frames or ninety cells, in the builder at one time. Some who use half-depth frames in their nuclei also use the same procedure in the cell building colonies, with a row of cells stuck to the bottom bar of each half-depth frame as it is given to the finisher.

Naturally, not all cells are of the same age in the builder at one time. Various systems are used. Some have three ages in each, the top cell bars being of one age, the center bar three days older, and the lower bar six days older, while other breeders run their builders in three rows, with three ages of cells in each row, so that automatically each ten days, cells in a certain position in each row are finished and ready for transfer to prepared nuclei.

Many honey producers are familiar with the organization of the cell building colony—a strong two-story colony with the queen in the lower chamber below an excluder, and two or three frames of bars with cells above. Most breeders used combs of young brood above next to the cells. This gives plenty of nurse bees around the growing cells, and also leaves mostly sealed brood below, which, when it emerges, will leave room for the queen to lay and thus cut down on the danger of the strong cell builder swarming. Swarming is a menace in these strong colonies. As their strength increases, it is often necessary to remove brood from the cell builder to prevent swarming fever.

Every eight or nine days, the upper brood is taken away; it is either put below to strengthen the present bee force of the hive, in exchange for younger brood or, if the colony becomes crowded, transferred to some other weaker neighboring colony.

NOTE:—This article will continue in the September issue.—Editor.

NECTAR SECRETION

(Continued from page 372)

acreage of this plant, available to the bees, was situated to the west of the apiary, on the Fargo clay alkali phase type of soil.

For the size of the apiary there was abundance of sweet clover and other bloom, throughout each of the seasons, within range of bee flight.

Weather data were secured from the United States Weather Bureau, Moorhead, Minnesota. This station is located approximately two and one-half miles from the apiary in which the scale colony was situated. Since this station might be included in the range flight of the scale colony of bees, the weather data can be regarded as satisfactorily representing the weather conditions as existing in the apiary.

Briefly, the July-August period of 1927 was favorable for honey production. The total rainfall or precipitation for those two months amounted to 3.03 inches; of this, 1.01 inches fell during July and the balance of 2.02 inches was recorded for August. The net gain in weight of the scale hive of bees for that period was 330 pounds; of this, 168¾ pounds was recorded for July and the balance of 161¼ pounds for August. Reference to the sunshine data for those months shows that for July, 1927, there was only 80 per cent of possible sunshine, or a total of 381.6 hours of sunshine for the 31 day period. August showed 82 per cent of possible sunshine, or a total of 358.3 hours sunshine for the 31 days of the month.

Turning to the July-August period for 1928, we find that conditions were what might be termed unfavorable for commercial honey production. The total rainfall for that period was 13.59 inches (more than four times as much rainfall or precipitation as occurred during the 1927 two-month period). Of this, 7.17 inches of rain fell during July, and the balance of 6.42 inches fell during August. The net gain of the hive of bees on scales for this 1928 two-month period was 102½ pounds, of which 80 pounds net gain was for July and the balance of 22½ pounds was for August. A review of sunshine data for July of that period shows 76 per cent of possible sunshine, or a total of 364.6 hours of sunshine for the month. August showed 76 per cent of possible sunshine, or a total of 334.4 hours of sunshine for the month.

In this connection it is of interest to mention the average spread between the maximum and minimum temperatures for the 1927 and 1928 periods, respectively.

Maximum temperatures for these periods refer to day temperatures and minimum temperatures refer to night temperatures.

For July, 1927, the average spread between the maximum and minimum temperatures was 20.5 degrees Fahrenheit; for August, 1927, the average spread was 24.3 degrees Fahrenheit, as compared with a spread of 20 degrees Fahrenheit for July, 1928, and 22.4 degrees Fahrenheit for August, 1928. In other words, the average spread between the maximum and minimum temperatures for the total July-August period of 1927 was 22.4 degrees Fahrenheit, and for the same period in 1928 was 21.2 degrees Fahrenheit—a difference of 1.2 degrees Fahrenheit in favor of the 1927 period.

So far, the weather factors, including rainfall, sunshine and temperatures, have been mentioned. Briefly considering these, it would not appear that the slight reduction of hours of sunshine for the 1928 period as compared with the period of the previous year was a major factor in connection with the reduced yield of honey for 1928. For the July-August period of 1927 there was a total of 739.9 hours of sunshine, as compared with 699 hours of sunshine for the same period of 1928; this represents a difference of only 40.9 hours of sunshine in favor of the 1927 period.

To all appearances the low yield of 1928 was due largely to the excessively heavy rainfall occurring through the two-month period. It is probable that the rains acted in a three-fold capacity to prevent nectar gathering by the bees. While it was actually raining the bees were confined to their hives; and, second, the heavy rains probably washed out or diluted the nectar in the flowers so that it could not be gathered after the rain had ceased. The third way in which an excessive amount of rain may probably affect nectar secretion, and indirectly gathering by the bees, may be by the effect of the rain on the soil. Of course, soils differ in their moisture holding capacities.

During the two-month period of 1928, on several occasions, fields in the vicinity of the apiary became soaked with water and remained in that condition for several days following heavy rains. This condition was not apparent for the 1927 period.

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Ottawa County (Mich.) Beekeepers Association

The Ottawa County Beekeepers Association will hold its annual picnic Saturday, August 9, jointly with Muskegon and Kent County beekeepers, at Johnson Park, Grand Rapids, Michigan. Speaking, games, prizes, music, and honey display will feature the program.

N. J. Smith, President.

CROP AND MARKET REPORT

Compiled by M. G. DADANT

For our August Crop and Market page we asked reporters to answer the follow questions:

1. How is the crop in your section compared to 1940?
2. Prospects from now on?
3. How is the new crop moving?
4. How are retail prices?
5. What is being offered jobbing for amber? for white?

Crop Compared to 1940

Maine seems to have an average crop. Northern New York, Vermont, and New Hampshire suffered from the drought as did eastern New York. Massachusetts and Connecticut are normal and central and western New York about 125 per cent of last year. New Jersey, Maryland and Virginia report about 50 per cent more than last year, tapering off in North Carolina, South Carolina, and Georgia where the crop probably averaged not over 70 per cent of the 1940 harvest. Florida is not quite up to normal, and Alabama, Mississippi, and Tennessee are considerably above normal although there are no heavy honey producing areas in those states for distribution.

Louisiana reports about 125 per cent of the last year's crop, but Texas is short, being only about 80 per cent. New Mexico will run average and Arizona has had an excellent crop of a proportion of about 130 per cent of last year.

Pennsylvania is having a much better crop than a year ago and Ohio will at least have last year's crop or better. One must remember that the last year's crop through the central states was not very heavy. Indiana may run as much honey as last year and Illinois undoubtedly will have as much owing to better crop in the northern sections. The eastern sections can hardly be better than a year ago, but they are excellent this year. In Iowa the crop is above last year's, being figured at about 120 per cent with the western sections particularly good. The same goes for Missouri Valley sections where sweet clover is abundant. Arkansas also reports much more honey than last year. Michigan can hardly have as much as in 1940.

Wisconsin, in most instances, reports as much as last year. Minnesota seems to be coming back to the big crop with excellent reports from all sections north to south. South Dakota and North Dakota also reporting much better than last year and same goes for the balance of the plain states, Kansas and Nebraska with Oklahoma probably no more than average because of drought.

In the intermountain states, Colorado's eastern slope is light but the western slope probably will make up for an average of last year. Wyoming seems better than a year ago and Utah about average with Montana likely not as much honey as in 1940 by 20 per cent. The crop is just starting in Idaho and conditions do not look any too good although water is extremely satisfactory. In Washington and Oregon the crop is better than a year ago.

It is in California that we find the worst disappointment. Much rain during the spring made prospects excellent for a bumper crop. However, they did not turn out so. The rain continued, cool weather arrived, bees did not build up, and the orange crop was only about 50 per cent of normal. In addition, the sage did not yield and the later crops were also a disappointment.

In the Canadian provinces, Quebec and Ontario are complaining of drought and sub-normal conditions. Manitoba is probably above normal, Saskatchewan is too dry, but better conditions appearing as one approaches Alberta and British Columbia. British Columbia reports conditions much better than a year ago.

Prospects

In New York it looks like possibly the buckwheat crop might not be better than last year owing to dry conditions. Along the Atlantic slope the crop is pretty well gone and prospects would not have reached above normal and perhaps below. This refers also to southern Georgia and Louisiana. In the southern sections the prospects are not any more than normal nor can we say that they are in Texas, or in New Mexico and Arizona.

Throughout the central state belt, prospects are normal. Prospects look unusually good in southern Michigan, in southern central Wisconsin and throughout Minnesota, as do they in South Dakota and North Dakota. In these areas copious rains have fallen and moderately dry, fair weather is what is needed.

In Montana prospects are below normal, and we anticipate that they would be so figured in Idaho. The intermountain sections will not be any better than a year ago if as good. Even California reports prospects now about 50 per cent of last year with practically all sections disappointed although some few sections have had some good flows. Prospects in Oregon and Washington are satisfactory. They are also in the northwestern Canadian provinces, but it is still too dry in Saskatchewan. Manitoba looks like it is in for a good crop with the eastern provinces possibly tapering off much less than a year ago.

How Is Crop Moving?

Crop is moving slow to good. We believe that there has been somewhat heavier demand on the part of bakers and retail trades than a year ago as there should be with the impetus given by reemployment. Reporters are about evenly divided between slow movement and fair to good movement of honey and the preponderance of better reports in the industrial sections.

Retail Price

In about 75 per cent of the cases beekeepers are reporting retail prices have, so far, remained the same and probably will remain the same. There is, however, a general tendency to get away from the extremely lower prices and boost them up from one cent to 1½ cents per pound. This applies pretty generally over all of the country. There is no tendency toward lower prices. How could they get lower?

Jobbing Prices Offered?

There have been very few offers on honey. Most of the buyers undoubtedly are waiting until the crop is more nearly harvested to get an idea of the size of the crop and be able to judge of what the market will do. However, there has been an extremely strong impetus given to the western coast prices by the purchasing of three and one-half million pounds of honey on the part of the Surplus Marketing Administration which is reported in this issue in our editorial page. Early we hear reports of truck loads of honey moving at 5 cents to 5½ cents f. o. b. producers' points with quite a number of producers already moving their honey at an advance of one-half cent to one cent per pound on contracts. This refers especially to the central western areas. We know of one beekeeper who is hauling his honey away as fast as it is harvested and at an advance of about ½ cent to one cent per pound over last year's prices.

Most suggestions are for prices above 5 cents to 5½ cents f. o.b. shipping point on white and 4½ cents on dark honey.

THE MARKET PLACE

BEES AND QUEENS

FOR STRONGER COLONIES, Bigger Honey Crops and Gentler Bees try our prolific, well bred, three-banded Italians. Used for years by leading beekeepers of the U. S. and Canada. Select young laying queens, 50c each; ten 45c each; twenty or more, 40c each. Prompt deliveries. No disease. We have one of the largest, best equipped queen rearing places in the South. H. C. Short, Fitzpatrick, Alabama.

LOOK—Three Banded Italian queens of fine quality, select untested 50c each any number. We do not try to see how many we can sell; we try to raise the very best that can be raised so you will get what you pay for. Satisfaction guaranteed. Alamance Bee Company, Geo. E. Curtis, Mgr., Graham, N. C.

QUEENS, Carniolans and Caucasians, untested 40c each; fifty or more 35c each. Prompt shipment, safe arrival. Tillery Brothers, Greenville, Ala.

REAL PETS — Brown's Stingless Bees. Queens $1 each. Brown's Apiary, Cape May Court House, N. J.

ONE 75c three band Italian Queen free to every new customer. L. H. Wagoner, Elon College, N. C.

EXTRA YELLOW Italian queens that produce bees a little more yellow than three-banded; more gentle and just as good workers. Untested, 50c each. Health certificate and satisfaction. Hazel V. Bonkemeyer, Randleman, N. C., Rt. 2.

GOLDEN QUEENS, excellent quality. Hardy, gentle, productive. Health certificate, satisfaction guaranteed 50c. O. E. Brown, Rt. 1, Asheboro, North Carolina.

GOLDEN ITALIAN bees and queens. Select untested, 50c each, any number. Carolina Bee Farm, Graham, N. C.

YOUNG LAYING leather colored Italian queens 50c each; 10, 45c each; 20 or more, 40c each. Jasper Knight, Hayneville, Ala.

NORTHERN BRED leather colored Italian Queens 35c; 3 for $1.00, in adjustable introducing cage. We co-operate with good honey producers in the selection of our breeding queens and believe our stock to be as good as you can buy. Diemer Bee Co., Liberty, Missouri.

HONEY FOR SALE

5000 lbs. cut comb honey. First quality, white clover. Fred G. Johnson, Pomeroy, Iowa.

FINE QUALITY clover honey. New crop in new sixties. Seven cents. Free sample. Clarence Jenks, Holcomb, New York.

FINEST QUALITY new comb honey; also extracted. N. B. Querin, Bellevue, Ohio.

HERE we come with tons of fine clover. Sample free. W. S. Earls, New Canton, Illinois.

WHITE CLOVER COMB No. 1, per case $3.50; fancy $4.00. White extracted in 60's, 7 cents. F. J. Smith, Castalia, Ohio.

HONEY FOR SALE—We buy and sell all kinds, carloads and less. The John G. Paton Company, Inc. 630 Fifth Avenue, New York. N. Y

CHOICE EXTRACTED CLOVER HONEY in 60's. R. C. Bish. Successor to Moore Apiaries, Tiffin, Ohio.

FANCY WHITE comb honey $3 case; amber clover $2.75; No. 2 comb honey $2.25. White clover extracted 7c; amber 6c; buckwheat 6c. C. B. Howard, Geneva, N. Y.

Copy for this department must reach us not later than the fifteenth of each month preceding date of issue. If intended for classified department, it should be so stated when advertisement is sent.

Rates of advertising in this classified department are seven cents per word, including name and address. Minimum ad, ten words.

As a measure of precaution to our readers we require reference of all new advertisers. To save time, please send the name of your bank and other reference with your copy.

Advertisers offering used equipment or bees on combs must guarantee them free from disease, or state exact condition, or furnish certificate of inspection from authorized inspectors. Conditions should be stated to insure that buyer is fully informed.

HONEY AND BEESWAX WANTED

HONEY WANTED—Several carlots of White Clover Honey and other white varieties. Send sample and quote price, f. o. b. New York City. Safe Owl Products, Inc., 925 Bergen St., Brooklyn, N. Y.

ALL GRADES extracted honey in truck lots. Mail sample and best price to John L. Tideswell, 2711 N. 63rd Street, Omaha, Nebraska.

WANTED—All grades honey in carlots or less. Send sample with lowest price. Schultz Honey Farms, Ripon, Wisconsin.

FANCY TUPELO HONEY for sale, barrels and 60's. Marks Tupelo Honey Co., Apalachicola, Florida.

FOR SALE—Fancy Iowa white clover extracted honey. Kalona Honey Co., Kalona, Iowa.

ORANGE, Palmetto and Mangrove honey in new sixties. Peter W. Sowinski, Fort Pierce, Florida.

WANTED—Clover chunk comb and section honey. State price. KEDASH BROTHERS, Chillicothe, Ohio.

ALL GRADES extracted honey wanted. Bee supplies and honey containers for sale. Prairie View Honey Co., 12243 12th Street, Detroit, Michigan.

COMPLETE LINE comb and bottled honey. Pure clover. Also packed in 5's and 60's. Central Ohio Apiaries, Inc., Millersport, Ohio.

CHOICE Michigan Clover Honey. New 60's. David Running, Filion, Michigan.

FOR SALE—Northern white extracted and comb honey. M. W. Cousineau, Moorhead, Minn.

WE BUY AND SELL ALL KINDS COMB AND EXTRACTED CARLOADS AND LESS. H. BLITZ, P. O. BOX 3452, PHILADELPHIA, PA.

HONEY FOR SALE—All kinds, any quantity. H. & S. Honey and Wax Company, Inc., 265-267 Greenwich Street, New York.

NEW COMB and EXTRACTED in season. H. G. Quirin, Bellevue, Ohio.

HONEY PACKERS—Write us for prices on carload lots of California and Western Honey. We stock all varieties. HAMILTON & COMPANY, 1360 Produce Street, Los Angeles, California.

HONEY FOR SALE — Any quantity, all varieties. B-Z-B Honey Company, Alhambra, California.

CASH FOR YOUR WAX the day received. Write for quotations and shipping tags. Walter Kelley Co., Paducah, Kentucky.

WANTED—Large quantities of chunk comb in shallow frames; also section honey. Central Ohio Apiaries, Inc., Millersport, Ohio.

WANTED—Carlots honey; also beeswax, any quantity. Mail samples, state quantity and price. Bryant & Cookinham, Inc., Los Angeles, California.

FOR SALE

ONE two frame reversible Wapakoneta extractor complete for both hand and electric power, with belts, pulleys and ¼ H. P. motor. All for $24.00. Linder's Store, Dephos, Ohio.

FOR SALE—Used once 60 pound honey cans, 2 cans and case 35 cents. Leon Short, Zion, Ill.

FOR SALE—One thousand colonies Italian bees, disease free—certificate furnished, with locations. Located in a fine honey producing section of central New York. Supers, winter cases and all equipment. Fred D. Lamkin, Union Springs, N. Y.

100 COLONIES in 10 frame Root D. Wall Hives. No disease. 3 to 5 tons surplus white clover honey on hives, Hoffman frames. Am quitting account age and health. B. F. Shumway, Reinbeck, Iowa.

FOR SALE—450 good colonies bees or furnish packages large northern producer and work. No foulbrood. 16 years' experience. Age 33, family. Haywood Bickley, Farmersville, Texas.

9 QUEEN EXCLUDERS; 2 frame reversible extractor. Albert Knack, Geneseo, Ill.

FOR SALE—Eight frame bee equipment. Merwyn Hansen, Titonka, Iowa.

STANDARD, three frame extractor, used once, nine dollars. Wooldridge, 2021 W. 70th Street, Chicago.

BRIGHT, once used sixties in corrugated paper cartons, 15c here. Any number. Will take honey in payment. Central Ohio Apiaries, Inc., Millersport, Ohio.

FOR SALE—We are constantly accumulating bee supplies slightly shopworn; odd sized, surpluses, etc., which we desire to dispose of and on which we can quote you bargain prices. Write for complete list of our bargain material. We can save you money on items you may desire from it. Dadant & Sons, Hamilton, Illinois.

SUPPLIES

FOR SALE — REIF-RAPPED cut comb cartons same old price until August 15th; also shipping cases. E. H. Reif, Kalona, Iowa.

THE ONLY COMPLETE LINE of wax rendering equipment ever offered—the "Perfection" line. A size and type suitable for every commercial beekeeper. Write for descriptive circular. Robinson's Wax Works, Mayville, N. Y.

COMB FOUNDATION at money-saving prices. Plain, wired, and thin section. Wax worked at lowest rate. Combs and cappings rendered. Robinson's Wax Works, Mayville, N. Y.

CUT COMB HONEY cartons and equipment. Get our prices on everything for cut comb honey. James Hilbert, Traverse City, Mich.

DIFFERENT, that's all. Written and published for the instruction of beekeepers. 52 pages of breezy entertaining beekeeping comment each month. One year, $1.00; two years, $1.50. Sample, 3c stamp.
Beekeepers Item, San Antonio, Texas.

LARGE CASH SAVINGS can be made by letting us work your wax into either wired or plain foundation. -Large independent factory manufacturing a complete line of bee supplies including extractors, etc. Selling direct saves you the agent's profit. Quick shipment from large stock. Large free catalogue explains everything. Walter T. Kelley Co., Paducah, Kentucky.

PORTER BEE ESCAPES are fast, reliable, labor savers. R. & E. C. Porter, Lewistown, Illinois.

WRITE FOR CATALOGUE. Quality bee supplies at factory store prices. Prompt shipment. Satisfaction guaranteed. The Hubbard Apiaries, Manufacturers of Bee Supplies, Onsted, Michigan.

WAX WORKED into high quality medium brood foundation 15c pound; 100 pounds $10.00; thin super 22c. Medium brood foundation, 10 lbs. $4.50. Fred Peterson, Alden, Iowa.

POULTRY

DEPENDABLE CHICKS, $3.95 Per Hundred up. Twenty breeds. Oldest Illinois-U. S. Approved hatchery, known for fair dealing. Chestnut Hatchery, Box 48, Chestnut, Illinois.

MISCELLANEOUS

BEST bee hunting outfit. Grover, Bristol, Vermont.

I will swap Automobile Polish for beeswax, pound for pound. Any quantity. Vernon K. Gould, Gorham, Maine.

THE BEE WORLD—The leading bee journal in Great Britain and the only international bee review in existence. Specializes in the world's news in both science and practice of apiculture. Specimen copy, post free, 12 cents, stamps. Membership of the Club, including subscription to the paper 10/6. The Apis Club, The Way's End, Foxton Royston, Herts, England.

"HISTORY OF AMERICAN BEEKEEPING," by Frank Pellett, covers a field which has been neglected until now. Ralph Benton in the "Frontier" says: "A great work presented at a timely moment. We wish there might be some way to place this book in the hands of every beeman." Nicely printed, well illustrated, large pages. $2.50 prepaid. American Bee Journal, Hamilton, Illinois.

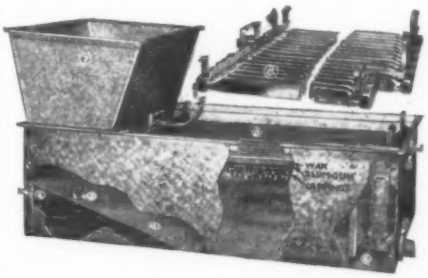
POSITIONS AND HELP WANTED

WANTED—Help to extract honey from 150 colonies (good crop). Modern methods and equipment. George Reints, Lindenwood, Illinois.

MAN to extract honey and finish bee work for season. Modern methods and equipment used. Reuben Neises, Junction City, Wisconsin.

Italian Strain BEES & QUEENS
Service and Quality Guaranteed.
Queens, each 40c or 3 for $1.00
2-lb. package with queen 1.35
3-lb. package with queen 1.75
No discount.
Shipping point, Epes, Alabama.
LITTLE BROS. :: Sumterville, Ala.

For honey's sake, join your nearest Association of Beekeepers.



Brand Capping Melter

While we are doing little Bee Journal advertising this season on the Brand Capping Melter, sales are exceeding previous years.

This is due to the general satisfaction they are giving, those in use selling others. Satisfied customers are the best kind of advertising.

S. P. HODGSON & SONS
New Westminster, B. C., Canada

Manufactured By
A. G. WOODMAN CO.
Grand Rapids, Mich.

SUPERIOR HONEY CO'
Odgen, Utah

WANTED : HONEY WANTED : HONEY

WANTED

CHUNK OR CUT COMB

HONEY

Regardless of where or to whom you have been selling your honey in the past—write us at once and let us know the quantity of chunk or cut comb honey you have for sale. We regularly pay higher prices than most producers receive for their honey. Investigate our offer now. Write today!

T. W. BURLESON & SON

WAXAHACHIE, - - TEXAS

WANTED: HONEY WANTED: HONEY

Send your cappings and old comb to MUTH for rendering into beeswax.
THE FRED. W. MUTH CO. Pearl and Walnut Cincinnati, Ohio

THE POSTSCRIPT

We hear but little about honey from the milk vetches in this country although it is reported that they yield good crops in Asia. Frank H. Drexel, of Crawford, Colorado, sends a specimen which authorities in Washington identify as **Astragalus haydenianus,** with the report that the bees work it strong and it yields well in his locality. There it is known as "bee weed" because of its attraction to the honeybees.

♦

There are 75 or more species of the milk vetches native to this country and there must be some good honey plants among them. We have several in the American Bee Journal honey plant test garden and hope to secure more. There are a number of items used in the drug trade which are derived from some species of milk vetch imported from abroad. Some species also are cultivated as forage crops in Asia, so perhaps a little investigation might bring to light some American species worthy of more serious attention.

♦

We are indebted to Mrs. A. E. Spencer, of Seattle, for a clipping from the Seattle Star. In the "Strange as it Seems" column by John Hix, H. H. Schumacher, honey wholesaler of Alhambra, California, is said to taste more than 12,000 samples of honey each year. It is said that he can tell the blossoms from which each comes and often the locality where it originated.

♦

Scott County beekeepers provided delightful entertainment for visitors at the Davenport, Iowa, meeting in June. A steamboat excursion on the Mississippi with a local historian to point out places of special interest was a feature of the occasion. A tour of the city with a police escort added variety to the program.

♦

Lespedeza bicolor, a shrubby variety which comes from Japan, is reported as yielding good hay when cut quite young. In our test garden it grows to a height of about six feet with very woody stems. It does attract the bees, however, unlike most lespedezas. Reports from Japan indicate that it is one of the principal sources of honey there. It is rather surprising to learn that it grows wild in the forests of Siberia and is found in extensive thickets where the trees have been felled. This indicates a shade loving shrub, while we have grown it in full sun. The flowers are very decorative and it is well worth-while as an ornamental. To me it appears entirely too woody for a worth-while forage crop.

♦

From Kentucky comes a report of sainfoin coming into bloom eight weeks from time of seeding. This year's planting in our test plots was on April 12 and a number of flowers were open on June 11. This is one plant from which the bees can get nectar the same year it is planted and expect a yield for several years to follow.

Our established plots started to bloom on May 7 and continued until the bees were still visiting a few scattering flowers on June 11. Thus the new seeding was coming on as the older plants stopped blooming.

♦

An Illinois correspondent writes that he has an acre of garden sage established in the last two years. Garden sage is a favorite of the honeybee as are most of the salvias. It offers the double advantage of a good bee pasture and a commercial crop. The leaves just now are bringing a high price and our friend should profit substantially as long as the war cuts off importation from Europe.

Several letters have recently come from readers who are preparing to try planting for bee pasture on a considerable scale. Some already had land available and others have bought land for the purpose. The scarcity of drug plants because of the war offers a special opportunity just now.

♦

Rev. A. J. Bissinger, of Prescott, Iowa, is enthusiastic about the possibility of improving the local bee pasture where the beekeeper takes sufficient interest. He suggests that more attention be given to saving seeds of honey plants and that they be put into the hands of persons who will plant them. It was at Bissinger's suggestion that we added the plume poppy to our test plots. The bees work this plant very eagerly but seem to get only pollen. It blooms in midsummer when pollen is abundant, so is less important than plants which bloom at a time of scarcity. Since the plant contains a toxic alkaloid, it is not likely to find any use except as an ornamental.

♦

From July 5 to July 10, a period of only five days, one of our colonies on scales filled two supers with a net gain of 78 pounds of honey. Perhaps this may reassure some of those who feared that the disease resistant stock would be lacking in other good qualities. There has been a great increase in the honey crops in this neighborhood with the coming of sweet clover into the farm rotation in the past three years. Those resistant bees, although a bit hot tempered at times, certainly have plenty of pep and they do store up the honey.

♦

The so-called perennial sweet clover which we secured from Australia proved to be the common form of biennial white. Thus another disappointment. There are persistent reports of perennial sweet clover from Asia and perhaps someone will be able to bring seed to this country. Should a true perennial form become available it should prove a very valuable addition both to our farm crops and bee pastures.

♦

There have been several disappointments thus far in the test gardens but some surprises as well. We expected little of sainfoin and it has proved to be one of the finest bee plants thus far tested and it seems to do well here. So much interest has developed that it appears if seed could be had at a reasonable price many would plant fields large enough to demonstrate its value.

♦

Letters coming to me indicate a great variation in the honey crop in different sections. From some come reports of a very light harvest, while others state that the yield is unusually heavy. Under date of July 7, A. G. Woodman writes that Michigan will have a fair to good crop and that locally there are only a few seasons in a lifetime as good. With the prospect for better prices, the beemen are very optimistic in localities where the crop is heavy.

♦

Mrs. Pellett has called my attention, several times recently, to the many ingenious devices used by manufacturers of food products to make the packages look larger than they really are. Much effort is expended to attract the eye to a pleasing package and careful examination usually reveals that appearances are very deceptive as regards size. Even the jars used by honey packers are often of this type.

♦

A university professor writes me that he has the urge to keep a few bees. It would be greatly to the advantage of the industry if more professional people were interested. Much of the advance in beekeeping has come through the effects of men of that type. Langstroth, whose invention of the bee space made the present day industry possible, was a minister.

♦

We find many references to the fact that the Indians made a beverage from anise-hyssop **(Agastache anethiodora),** but nowhere do we learn at what stage it was harvested or how it was prepared. Mrs. Pellett is experimenting with the plant to see how such a drink should be made. She has been able to make anything from a pleasing drink to a strong medicine depending on how it is brewed. In time we hope to learn more about the many uses of this interesting plant, which is one the finest honey plants ever to come to our attention.

FRANK C. PELLETT.